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MACKENZIE VALLEY PIPELINE INQUIRY

IN THE MATTER OF APPLICATIONS BY EACH OF
(a) CANADIAN ARCTIC GAS PIPELINE LIMITED FOR A RIGHT-OF-WAY THAT MIGHT BE GRANTED ACROSS CROWN LANDS WITHIN THE YUKON TERRITORY AND THE NORTHWEST TERRITORIES, and
(b) FOOTHILLS PIPE LINES LTD. FOR A RIGHT-OF-WAY THAT MIGHT BE GRANTED ACROSS CROWN LANDS WITHIN THE NORTHWEST TERRITORIES,
FOR THE PURPOSE OF A PROPOSED MACKENZIE VALLEY PIPELINE

and

IN THE MATTER OF THE SOCIAL, ENVIRONMENTAL AND ECONOMIC IMPACT REGIONALLY OF THE CONSTRUCTION, OPERATION AND SUBSEQUENT ABANDONMENT OF THE ABOVE PROPOSED PIPELINE

(Before the Honourable Mr. Justice Berger, Commissioner)

Yellowknife, N.W.T.

December 8, 1975.

PROCEEDINGS AT INQUIRY

Volume 98

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Mr. Reginald Gibbs, Q.C.,
Mr. Alan Hollingworth &
Mr. John W. Lutes, — for Foothills Pipe Lines Ltd.;

Mr. Russell Anthony &
Pro. Alastair Lucas — for Canadian Arctic Resources Committee;

Mr. Glen W. Bell and
Mr. Gerry Sutton, — for Northwest Territories Indian Brotherhood, and Metis Association of the Northwest Territories;

Mr. John Bayly
or
Miss Leslie Lane — for Inuit Tapirisat of Canada, and The Committee for Original Peoples Entitlement;

Mr. Ron Veale and
Mr. Allen Lueck — for The Council for the Yukon Indians;

Mr. Carson H. Templeton, for Environment Protection Board;

Mr. David Reesor — for Northwest Territories Association of Municipalities;

Mr. Murray Sigler — for Northwest Territories Chamber of Commerce.

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Yellowknife, N.W.T.

December 8, 1975.

(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

MR. BAYLY: Mr. Commissioner, before Mr. Scott begins, I've just passed out the fish panel evidence of the Canadian Arctic Resources Committee and the evidence on rare and endangered species. I've been informed by telephone today that Mr. Anthony will be up later in the week with an amendment to the evidence of Mr. Zolti, question 18 apparently will be replaced by a new question and answer 18. Apart from that, it's as you find it.

MR. MARSHALL: Mr. Commissioner, I mentioned last week that I would make available some maps indicating the line that would run to the Shell plant that's being proposed, and also the --

THE COMMISSIONER: Excuse me, I'm having trouble hearing.

MR. MARSHALL: It's probably because my mike's off. Is it clearer now?

THE COMMISSIONER: O.K. Go ahead.

MR. MARSHALL: Yes sir, last week I mentioned that I'd make available a map which would show the location of the plant of Shell Canada Limited in the delta, and also show the revised routing from the Parsons Lake plant of Gulf. I have a proposed pipeline route map pertaining to the cross-delta amendment which shows those two areas, sir, and in addition there are three alignment sheets that

accompany them. I have sets available, I'll hand them out to participants and I'll file one set with Miss Hutchinson.

THE COMMISSIONER: Fine.

(PROPOSED PIPELINE ROUTE MAP RE CROSS-DELTA AMENDMENT MARKED EXHIBIT 354)

(3 ALIGNMENT SHEETS MARKED EXHIBIT 355)

MR. SCOTT: Mr. Commissioner, at the end of Friday I was attempting to put the problem of birds in perspective by emphasizing the number of species that fall within your sphere of interest and also attempting to quantify in some fashion the value of wildlife.

ALEXANDER WILLIAM F. BANFIELD
WILLIAM W.H. GUNN
RUSSELL ALEXANDER HEMSTOCK
RONALD DANIEL JAKIMCHUK, resumed:

CROSS-EXAMINATION BY MR. SCOTT (CONTINUED):

Q Along that line are you aware of any studies to which you had access which have attempted to illustrate the extent to which wildfowl are used by people as food in the north?

WITNESS GUNN: You just threw me by adding "in the north", at the end. I was going to say that I'm quite aware of studies undertaken in the United States. I don't think I am familiar with studies indicating details of the wildfowl used in the north, except that I know that the Canadian Wildlife Service does make or keep track annually of the estimate of the birds killed by native populations in various

regions of the north.

Q Are you aware of any studies that have been done in this connection in the James Bay area?

A Yes sir, I believe that a study was done there. I think Dr. Banfield is aware of the details of that. He was there at the time of the hearings.

Q Well, two questions that follow from that. I take it first of all it was not within your terms of reference to prepare any such analysis for the applicant.

A I should say that we didn't consider it, so we did not suggest it to the applicant that we should do that.

Q But I take it also that you, as an experienced man in the north, would recognize as a matter of fact that there is substantial hunting for food purposes by natives and others, in the area in which we're interested.

A Yes, we feel that the hunting by natives in our areas, particularly in terms of subsistance hunting, is a very important factor.

Q Well, now the last thing I asked you on Friday had to do with the critical areas that you had listed in your evidence, and I'm not clear whether I was able to induce you to add to that list the area bounded by the Moose Channel Flats on one side and Ellis Island and the Oliver Island group on the other.

A Well, sir, the difficulty with that is that we consider the Mackenzie Delta as a whole a critical area. If you begin taking sections of it and saying that, "Yes, this is critical," then that implies that the rest of it is not. There are some parts of the delta more important than others, but I would consider the delta as a whole a critical area. I would be reluctant to sub-divide it very much more than that.

Q Well now, in determining your list of critical areas, would it be fair to say that you looked at those areas and made the determination that they were critical,simply from an examination of bird life and that you did not consider the conflux of other factors such as mammals, vegetation, and so on except that they touched on bird life.

A We made our decisions basically on the distribution and densities of bird life. We looked at other factors. Vegation is of course an important factor, and in some cases mammals, and in other cases items that are food for birds, such as invertebrates are important.

Q But I take it it is clear that you considered those factors only as they affected bird life one way or the other?

A I think that is a fair statement, yes.

Q In short you may and perhaps it is obvious from your paper that you made no effort to list areas that could be critical because of the conflux of a variety of life and vegetation?

A Oh, I wouldn't say that. I think that a good number of the areas that we cited as extremely sensitive are that way because of that conflux.

Q Well, now, once having defined as you have done the areas that you regard as critical, what follows from that? Is it clear, first of all that in your view they require a special degree of protection?

A Yes, that is what follows. In our view at certain times they require special attention in terms of protective measures.

Q Do you go so far as to say that it would be imprudent to construct compression stations in those areas?

A Well, if you undertake such a project as that, then it is going to have an impact, or it may have an impact on that particular population or group of birds which might have long term results, and this is what we are trying to stay away from, any long-term results. So that if we have a project that is likely to do that, then we simply say, "Well, if you do that, you are likely to have long term results, long lasting results", so that the population under consideration may be diminished. In other words, you do so at risk.

Q So would it be correct to say that in general terms it is your recommendation that within critical areas there should be no development such as compressor stations, staging areas, gravel mining and so on, unless one is prepared to assume long-term, adverse implications for the bird population?

A It depends on the type of development. A compressor station has long-term effects because it is going to be there for a good many years. On the other hand, the immediate effects may be felt, say, only within a mile and a half to two and a half miles, as far as the station itself is concerned, but because each station has its own airstrip, then you will have aircraft coming in and leaving there periodically, and this in turn may have a larger effect.

Q Well, my difficulty is this. You have gone to the trouble to define these

critical areas with some precision, and I am not quite sure what that means. Does it mean that the applicant should keep out of those areas?

A In our view we would recommend that the applicant either stay out of them or undertake his project in such a way that it would not have long-term impact. By this I mean that you might run a pipeline through the area during the wintertime. Winter construction might get around the difficulty and the impact during operation might be small enough so that it is not likely to affect the population under consideration. On the other hand, if you were to put a compressor station there, that might have a serious effect, or if you were to use as a borrow pit, an area occupied by peregrine falcons, for example, that would have a long-term effect.

Q Would this be the way that it could be put then, that insofar as the applicant desires to place any facility, apart from its pipe in a critical area, such as an airfield, a compressor station, a gravel pit, a staging area, it would be your view that the matter had to be looked at again to develop special, or to develop first of all, a determination as to the impact of doing that, and secondly to determine mitigative measures, if they were possible, to deal with it?

A I would agree with you but I would insert in there the possibility of looking for an alternative site.

Q An alternative site in the face of a critical area would be your first choice.

A Yes.

Q Well now, there is evidence and there will be evidence at a later stage that accidents occur through the fault or through the desire of no person, particularly in connection with the matter of oil spills, and I want to know first of all, are you familiar with the applicant's proposals with respect to control and cleaning up of oil and like spills?

A I am familiar with the -- or at least I have read a number of times the plans and program laid forth in the construction part of the environmental statement.

Q I want to refer you particularly to oil spills that may occur at staging areas and so forth. Is there adequate material in the application, in your judgment, to determine whether the measures contemplated are adequate from the point of view of the bird population? I should tell you that Mr. Hemstock has said that at a later stage of the Inquiry, he, on behalf of Arctic Gas will be bringing forward a detailed analysis of these problems and the proposed solutions. What I'm really asking now is do you feel you have enough information to make

a judgment about the adequacy in precise terms of the applicant's response to that problem?

A No, I don't think we have yet because as you say, and as I was about to say, a detailed method of preventative measures has not been established yet, in my opinion, as far as birds are concerned. What we have to go on is that the applicant has stated that he will take extraordinary measures to endeavor to see that such spills don't take place. As you have said, accidents are always possible and we have made our point on this and in my own direct testimony I have said that, for example, one of my provisos was that pollution did not take place along the Beaufort Sea coast.

Q Well now, let me deal with a number of other matters. You've told us about the importance of m itigative measures, particularly in critical areas, if other works are established such as compressor stations, and let me ask you this: Leaving aside the possibility of avoidance which is your first choice, are you sufficiently aware about the mitigative measures that the applicant proposes with respect to compressor stations to determine their adequacy, or is that something that will have to be done later?

A I think I am reasonably aware, to be specific about the business of fencing the area, containing personnel within the area, and of placing an upper limit on the intensity of sound

arising from the compressor station. We know something about the number of flights that is likely to be going in and out of there during operations. Those things we know.

Q Well, are you able to judge at this time, whether for any given compressor station site, those measures, if adopted and applied, will be adequate mitigation?

A We have looked at them from the point of view of where the compressor sites have been placed, and I have taken the viewpoint that there may be some considerable degree of disturbance up to say a two mile, 2 1/2 mile radius from the compressor site. Now the question is, that would take out, say, 25 square miles of territory. The question we have asked ourselves, is that particular 25 square miles, in that particular location, going to be of a particularly critical nature to bird life? That is how we have treated it. In some cases we think it is; in some cases we are pretty sure it will be, in others we don't think so.

Q Well, much obviously has to be left to final design in a project of this type, and what I'm concerned about, particularly with reference to the North Shore, and leaving aside the delta for the moment, about which you have your views, are you satisfied with the location of the compressor stations, air fields, staging areas, and gravel mining locations?

A No.

Q Can you tell us in particular terms the points of your dissatisfaction, or are they all set out in your memoranda?

A The particular ones we have referred to are three compressor stations, CA-03, 05, and 06. One of these is in Alaska, two are in Canada. We would prefer to see them moved because they happen to be in areas that we know -- in two years at least, or one or both of two years -- have been used by snow goose flocks during the staging period. We would therefore like to see them outside of those areas and we have asked that the matter be considered to see whether they could be moved outside.

Q Well now, apart from compressor stations and apart from what is in your memorandum, have you given any consideration, have you been able yet to give any consideration to the location of rock mining areas, things of that sort?

A Along the North Slope, no, for the reason that certain areas have been designated as possible borrow sites or rock mining sites, but there are a good many more designated as possible sites than there are those which, in the eventuality probably will be used, and we feel that the important time to consider those sites is when a firmer judgment has been made as to which ones are the most logical ones to use in relation to the final positioning of the various sites where the material would go.

Q Well, do I understand, therefore, that on that subject, the question of their location and the mitigative measures that are associated with them and your recommendations on that, is something that remains to be dealt with as the applicant moves toward final design?

A That is still to come in detail, yes.

Q Well, now, dealing with staging areas you told Mr. Bayly at page 14206 of the transcript that the original proposal was to have ten staging areas on the coast, that your -- that those were simple engineering sites suggested, that they were reduced as a result of your representations to five including one at Prudhoe Bay and that two of the other four were sited at DEW line sites, and then you said, on our particular recommendation that they select sites that had already been disturbed. Is that how it happened?

A I think there are other factors going into it over and above our own recommendations, but that is how it turned out. I am sure that the recommendations that we made were an important factor in arriving at these results.

Q Well, now, I take it that the advantage of putting a staging site at a DEW line site, from the bird point of view, was that the DEW line site was at least an area that had previously been disturbed in the first place?

A That is one advantage.

Q Yes, and the second advantage is that if there was any habituation of birds to the existence of the DEW line station, that had already occurred and was a kind of plus?

A Yes, I think that can be considered another advantage.

Q Well, now, let me put this proposition to you. I understand that there will be, I think, four compressor stations in Canada on the North Slope. From your point of view, would it be desirable to locate these at DEW line sites if that were possible?

A Well, first of all, my understanding is that there will only be three. However, assuming that, I think I can answer your question. The advantages in having the compressor sites at the DEW line sites I think would be the same as having the staging sites there. There would be definite advantages. The only disadvantage I see -- well, there are

two possibly, one is that it might lengthen the line, the other is that it might cause long-term traffic along the coast which might not be desirable.

Q Well, let me put the proposition to you this way, and I ask you to leave out of it for the moment the engineering considerations and leave out for the moment the environmental consequences of lengthening the line. Do you understand the two riders that I attach?

A Yes.

Q All right. Now, with that in mind, do you think that from your point of view that there would be virtue in putting the compressor stations and the staging areas at or near the present DEW line locations? On balance?

A I wouldn't like to give you a definitive answer on that at this time without going through our data, but on the surface of it I think that it is an attractive idea.

Q Yes. Well, now, did you have access to any data which revealed the extent to which the DEW line sites were used by incoming and outgoing aircraft at present or in the immediate past? Or when built?

A I have read history of the DEW line construction operation and I think there were some figures in there. I also have seen some figures of flights originating from Inuvik, some of which no doubt went to the DEW line stations, but I don't think that I have the precise number of flights

in and out. My recollection is that for DEW line servicing alone, there is about one flight every two weeks to a month. One or two flights per 30 days, shall I say.

Q Well, now, Mr. Hemstock, I understand that the DEW line sites on the coast divide themselves basically into three categories, first of all, the main sites for 300 people, as at Cambridge Bay and Barter Island and so on. In the second place, auxillary sites which were to hold 30 to 50 people such as at Shingle Point, and in the Third place, intermediate sites originally desiged for about ten people such as at Stokes Point. Would that be in general terms your understanding of them?

WITNESS HEMSTOCK: That is my general understanding, although I am surprised at the figure of 300 men at the main stations. My understanding is that at Kaktovik now there are, I think, 65 people stationed there --

MR. MARSHALL: Excuse me, Mr. Scott, what they initially had been designed for or what they are accommodating now?

MR. SCOTT: Well, what they were initially designed for. I am trying to get some idea of their general size.

A I am giving you the information I have of the present utilization. I don't know the original.

Q And I take it that each of the sites is built on a gravel pad or some kind of

pad to sustain the works?

A Yes, reading the history of the selection of the sites it was apparently based in great part on the location of gravel supplies, it would allow the construction of airstrips and at the same time provide easy access to bases. I think many of the buildings are on piles, however.

Q I just want to get a picture of them first of all. I take it that each of them has in addition to the gravel pad an air strip of some kind.

A I believe that's right.

Q And each of them has a generating plant of some kind to service the works there.

A Has or did have.

Q Has or did have. All - right, and for what it's worth there has been some disturbance of the tundra directly between the Dew Line stations. Vehicles have obviously travelled between them.

A I know that they have between some stations.

Q Yes.

A I'm not sure whether all of them.

Q And I also understand, Mr. Hemstock, that the sites are located almost exactly 50 miles apart because of the requirements of the operation of the Dew Line.

A That's probably about right, yes,

Q Well, what I want to ask you is, did Arctic Gas give any consideration to locating its compressor stations, staging areas, air fields, either at the Dew Line or immediately adjacent to the Dew Line locations?

A Yes, we did originally and in the Alaska portion and partly in the Yukon, of course, we ended up with this alignment that is several miles in-shore which we thought was best from environmental -- from the environmental standpoint.

Q May I interrupt you just for the moment? I'm not concerned about the alignment of the line at the moment. I'm simply concerned about whether consideration was given to the facilities I've described being at or near those Dew Line locations.

A Yes.

Q And what was the determination that was made?

A Well,as I was beginning to explain, the determination was that the better place for the line, in our opinion, was some miles in-shore, particularly in Alaska, which ruled out the possibility of locating the compressor stations at the Dew Line sites. However, we have, as Dr. Gunn has described, continued to look at the possibility of putting the staging sites at the Dew Line locations.

Q Let me put this proposition to you. Was any consideration given to leaving the line location where it is, and putting the compressor stations on the Dew Line pads or near them with a join between the two?

A No sir.

Q Why not, and before you answer I note that the Dew Line locations in at least one place -- it may not be typical -- are only eight

or ten miles from the location of the line.

A Well, the eight or ten miles, though, would mean a loop of in this case 16 or 20 miles, that you have to take out to the compressor station and back, and this is simply not feasible from an engineering or an economic standpoint.

Q I take it that it's feasible from an engineering viewpoint but not from an economic viewpoint. Is that --

A Well, I suppose it's feasible. In effect, though, if you had say a 16-mile line out to a compressor station and back you'd effectively then have only 18 miles on the mainline between compressor stations. You would end up then with that many more compressor stations, and therefore more impact in total.

Q Was any thought given to a modest alteration in the line so that it moved in toward the compressor station site at the Dew Line?

A There was some -- is some consideration being given to that in the Alaska portion.

Q Why is that not being considered in the Canadian portion, may I ask?

A Well, the spacing of the compressor stations, again from an economic standpoint, becomes pretty well fixed as the length of the line from Prudhoe Bay is determined. I think we discussed this before and there is relatively little freedom for the

final selection of station spacing; but as we get to final design, certainly those factors will be considered.

Q What I'm getting at is if you kept the main line where it is, and put the compressor stations at or near the Dew Line locations, and I think we dealt with this in another context before, and they're eight miles apart, isn't it possible that a small loop of eight miles there, will increase the pressure, so as to ensure that the locations will remain 50 miles apart?

MR. MARSHALL: I'm sorry, Mr. Scott. I don't understand that.

MR. SCOTT: Mr. Gibbs and I, in pursuing this matter in a different context with the engineers, as I recall the evidence, Mr. Commissioner, persuaded Mr. Horte and perhaps others that there was virtue to considering moving -- let me put it this way, that you could move a compressor station say 60 miles away from its previous one, if you built up the pressure by a loop over the 10-mile differential, I think Mr. Horte conceded, I don't have the evidence reference, that that was at least a possible way of ensuring, in given locations that the compressor stations might be further away than the computer envisaged on a single line. Now, Mr. Hemstock, you'd be familiar with that general approach, would you?

A Yes, I understand now what you're speaking about. You're suggesting that

a portion of the line be looped, in other words there would be two 48-inch lines for a portion of the line between two compressor stations.

Q Yes.

A And that is a method which would allow broader, wider spacing of compressor stations.

Q Well, let me see if I can just leave it this way. Is the applicant presently considering any such scheme which would permit it, in Canada, to leave the line approximately where it is, but yet utilize the Dew Line sites or adjacent property for compressor stations?

A No, we are not considering that at the moment. We are looking towards the final design of the -- and the final selection of the compressor station equipment , and that will allow us then to home in on the exact mileage between stations and at that time then the other mitigative measures, such as looping, or such as an overpowered station, in terms of all of the rest, could be examined to provide the mitigative measures to take care of special areas such as Dr. Gunn has outlined.

Q Well, dealing with the suggestion that I put forward, do I understand that because you are considering some such modification in Alaska, it cannot be said that it's been ruled out for the Canadian portion of the line?

A Yes, that's correct; that

was the point I was trying to make, that normally you would start at the Prudhoe Bay end and try and get the spacing there, and that would have certainly a major impact on the spacing and the site selection in Canada; but it all has to be looked at together.

Q So when all the contingencies are considered, and the examinations made, I take it you will ultimately have to pass on whether the compressor stations in Canada can be at the Dew Line locations and leave the line where it is?

A Yes.

Q Yes, and I take it that before that is done an environmental balance sheet will be drawn up by Dr. Gunn, at least, comparing the two modes of transporting gas and compressing it from the point of view of wildfowl.

A Yes, and I think that there are other environmental advantages, too, -- probably in the area of mammals that would let us choose if we have the choice, the site which have already been disturbed.

Q And just so that we have it on record. I take it that it appears that a number of these DEW line sites have already been abandoned, and the balance, if you can believe the press, will be abandoned in due course, whatever that is?

A Some of them have been abandoned, yes.

Q And I take it, and perhaps I am being repetitive, in which case I will stop, but I take it that Arctic Gas sees the potential, I don't put it any higher than that, the potential virtue in environmental terms of using areas that have already been disturbed by aircraft, staging of equipment, gravel digging and so on?

A Yes, sir.

Q Will you keep an eye on them, Dr. Gunn, as they move towards this evaluation?

WITNESS GUNN: As long as I am still around, I will, sir.

Q Well, now, Dr. Gunn, could you just in a brief way described the consequences of an oil spill for waterfowl, and I want to ask you to think about three kinds of waterfowl: ordinary waterfowl, if I can call them that; molting waterfowl;

and fowl on nests.

THE COMMISSIONER: I wonder if you could say what kind of spill, if it is helpful to --

MR. SCOTT: All right, let's posit for this analysis, a leaking bladder around the staging area. Are you with me so far?

A An oil bladder.

MR. MARSHALL: Do we have to use that example, Mr. Scott?

MR. SCOTT: I didn't realize that Mr. Marshall was sensitive about that so early in the day -- Since Dr. McCart's gone I thought perhaps it was safe.

(LAUGHTER)

MR. MARSHALL: A bladder of what, sir? A bladder containing what, Mr. Scott?

MR. SCOTT: A bladder containing oil.

MR. MARSHALL: Oh, thank you.

MR. SCOTT: We have records of a number of oil spills, accidental in nature which have occurred generally in this area. Bears have slashed bladders at staging areas, a helicopter of which we know came too close to a bladder, sliced a hole in it and 40,000 gallons of oil fell into the Peel River, and so on. I am just asking you to take that as the kind of example, and tell me with respect to the three kinds of waterfowl, what the

consequences are?

A Can I throw in a few shore birds, too?

By ordinary waterfowl I take it you are assuming birds that are not in molt and have their full powers of flight?

Q Yes.

THE COMMISSIONER: Well, you said ordinary waterfowl, moulting waterfowl and nesting waterfowl?

MR. SCOTT: Yes, I would like you to deal with all three.

THE COMMISSIONER: SO the ordinary ones are not either moulting --

A Or nesting, right.

MR. SCOTT: Loafing.

A Taking your ordinary waterfowl category first, the chief problem is that in the course of visiting the area, stopping off in the area, that they will come into contact with oil at the surface of the water or along the shoreline, and oil has the propensity of destroying the water repellancy of their feathers and two effects occur from that. One is that they, if badly oiled, they may not be able to float on the water, but the other perhaps more serious one is that they lose the insulation from their feathers, and even a small oil stain on a bird may cause it to lose its life because of loss of insulative power of the feathers.

They can, however, if only

slightly oiled, get up and fly away, and it is difficult then to determine what the loss is, because they may ultimately die some considerable distance from the spill.

Birds that are moulting, of course, cannot fly away. So that it is particularly bad if moulting birds become trapped in oily water. They have only the opportunity to swim away and probably wouldn't get very far because the oil would have too great an effect on them.

In nesting areas, the nest being on the land or on the edge of water, there would have to be, if it is going to effect the nest directly, there would have to be a flooding or some land spillage to affect them. On the other hand, birds that feed out in the water while nesting, taking turns to incubate the eggs and look after the young, could become contaminated with oil during the course of searching for food on the water. Those are the chief distinctions as I see them. The chief mitigating measure of course is to contain the oil spill within as small an area as possible. If it is on the shore it might be relatively easy to do this. If it is offshore then there are more difficult problems to encounter.

Q Do you know, Dr. Gunn, whether there are any consequences or any unfavourable consequences for wildfowl if dispersants are used in attempting to get rid of the oil slick?

A Yes, in some cases the

cure is almost worse than the problem, because again you get loss of the repellancy on the feathers and a bird that might have only a small oil stain might become fairly soaked with repellants of that nature and again would lose bouyancy and insulation.

Q So that would it be fair to say that in areas where birds are located in any one of these three phases, and bearing in mind that the cure may be worse than the disease or as bad as the disease, the only real solution is avoidance of the problem?

A I would agree with that. Mitigative measures are being developed, but they are still in their infancy and they are not by any means 100% effective. In fact, it is very difficult to scrub and clean a bird and keep it alive long enough to put it back into the environment, so certainly the best cure is not to have the accident occur in the first place.

Q I take it that in recent experiments in de-oiling birds, basically none of the bird populations have ever survived that exercise?

A That has been the case almost completely until quite recently. Now some people,largely under experimental situations, are having a much better success, but it is still a long way from being even 50%.

Q Yes. Well,now let me deal with one other kind of environment. I hesitate to use the word, "ecosystem", because I am

not quite sure what it means, but I take it that apart from the shoreline on the North Slope, the ponds and lakes that are back of the shoreline, are a critical area for bird populations?

A Mr. Scott, you've been using the word "critical", and we used to use it and got put down for it, because it was difficult to justify. I like to use words like "sensitive" or "very important". To be critical, you have to justify -- you have to put up a case that if you deprive birds of that, this is probably the end of the birds. So I consider it an extreme term and I would like to mention it now just so that I don't agree with you on something when you say "critical", I don't really mean that.

Q All right, that's fine.

THE COMMISSIONER; Why don't you use your terminology, Dr. Gunn and we'll try to use it too?

MR. SCOTT: All right, sensitive.

Q Stopping there, however, I take it that if the ponds were destroyed in some fashion, what was then sensitive would then become a critical problem.

A If all the ponds on the North Slope were destroyed, that would be a critical problem, for the birds that normally nest there.

Q Well now, we've also heard you say and heard Dr. McCart say that the interest that you have in the ponds and the interest that he has is dissimilar because of the depth that is required for fish and the depth that is optimum for birds and fowl.

A There are some similarities, some differences.

Q Yes.

MR. MARSHALL: Mr. Scott, I don't think I recall it that way. Did you have a particular reference in the transcript?

MR. SCOTT: No, I don't have the reference, but I understood Dr. McCart to say that he was principally concerned with ponds in which fish would over-winter which are inclined to be deeper, or at least have free-flowing water; and I understood Dr. Gunn to say earlier that he was primarily concerned with the shallower ponds which would provide feeding for the fowl. Have I got that right, Dr. Gunn?

A As far as you went, sir. I don't think we considered the depth of the pond as such an important factor as other factors, such as the length of the perimeter and the steepness of the bank, and whether or not a stream came in or went out of the pond or lake.

Q I take it, however, that many birds feed from the shallower ponds where there are pond reeds and so on.

A That's quite correct. Most of the birds using those lakes and ponds, I think would feed in the shallower areas. There are, however, diving ducks and loons that use the deeper parts.

Q And it is important that in -- or it is sensitive that in ponds that are used, the weeds and wildlife should continue to grow to provide a source of food.

A That is right.

Q Now, with that in mind has Arctic Gas as far as you know, done any studies on the effects of siltation and sedimentation in such ponds?

A That's a little out of my area, Mr. Scott. Perhaps you could direct that to Mr. Hemstock.

Q Mr. Hemstock, do you know whether that's been done?

WITNESS HEMSTOCK: I think we have not done any studies with regard to siltation of ponds. We don't think that that's a possibility with the construction which we propose.

Q Yes. Well, Dr. Gunn, your concern, unlike Dr. McCart's about siltation, I take it, is that siltation can do one of two things, it can kill plant undergrowth, or alternatively it can make the water less pervius to sunlight, and in that way kill plant growth.

WITNESS GUNN: Yes, or it may affect the invertebrate populations too, upon which some birds depend.

MR. MARSHALL: I don't mean to quibble, Mr. Scott, but I don't think that's really dissimilar to Dr. McCart's interest.

MR. SCOTT: I think Dr. McCart had a concern which he emphasized, Mr. Commissioner, a number of times that siltation would not kill fish, but that it would kill roe by covering it and preventing

oxygen. In short, as I understood it, Dr, McCart was not concerned about turbidity, but simply about the fallout on fish roe.

Q Well now, Dr. Gunn, are aware of problems that have arisen in a number of lakes near the Inuvik area as a result of sheet erosion caused weither by fire or seismic lines?

A I know that this has occurred as a result of a fire in the Inuvik area, some years ago in some ponds and lakes.

Q Are you aware of cases where erosion of this type has occurred as a result of seismic line work?

A I think that's quite a common occurrence, yes.

Q Well, let me put this to you. Bearing in mind the volume of work that will be done when the application proceeds on the North Shore do you think it would be desirable to perform some studies to determine the likely effect of such work on ponds that are suitable for bird feeding?

A It might be possible to examine old seismic lines to see what effect, if any, they have had on ponds. It's a question of whether winter construction is going to cause problems in regard to siltation. As far as the line itself is concerned, I have been assured by the engineers that they can thoroughly control downstream effects; the downstream effects of siltation is one problem that

we examined very early in our studies and we have been assured that this is not a serious problem.

Q Well, in general terms let me put this proposition to you, that in relation to ponds and small lakes on the North Shore, there are two bird problems, or potential problems. (1) is the draw-down of water which you and Dr. McCart discussed earlier, and the effect that may have on some ponds; and

(2) the effect of turbidity, and that both of those as you move toward final design, have to be investigated to determine appropriate sites.

A I agree with that.

Q Well now, let me come to rock mining, and I want to ask you what the consequences are for birds of such facilities being opened.

A The chief consequence of rock mining as I see it is liable to be the impact on gyr falcons and their nest-site. Gyr falcons tend to nest on rock faces and if these nest-sites happen to be in areas where rock is being quarried, and the nest-sites are destroyed, this would be very undesirable. However, we do have a pretty good idea of where these -- in fact we have a precise idea of where most gyr falcon nest-sites are and it is still to be worked out with the engineers when they come down to deciding where the quarrying will take place, whether or not this is going to take place in areas where gyr falcon are present.

Q I perhaps misled you by the expression "rock mining" which no doubt led you to think of bedrock mining. Let me put this proposition to you. What about gravel mining of the active flood plain and its implications for birds?

A Well, I have been given to understand the active flood plain will not be gravel mined. I'd like to confirm that with Mr. Hemstock, but certainly --

THE COMMISSIONER: I think that was the active channel.

A The active channel?

MR. SCOTT: We had a fairly extensive debate on what was meant by that, but --

A I was going on the word "active". The effects on birds, as I see them, are that certain nesting, feeding, or loafing areas may be damaged or destroyed, and that there might be downstream effects from that if it were done during the summertime.

Q Well, what about the late summer and early autumn on the Yukon coastal plain particularly?

A There is likely to be a conflict with the activities of staging snow geese, of course, and possibly other migrants working backwards and forward or east and west along the seacoast. There may be some explosive work involved in that, and this may have some undesirable but probably short-term effect.

Q Let me ask you, Dr. Gunn, would it be fair to say that your views about the impact of active flood plain gravel sources on the Yukon coast is at a relatively preliminary stage and more attention will have to be given to that as one moves toward final design and final location selection?

A That is correct.

Q And I take it that you can, however, in an abstract sense, envisage a number of fundamental problems which will affect bird populations if careful selection is not made?

A Yes, that is correct.

Q And I take it that at the moment you have been asked for or have given no particular input on the selection of gravel mining sites?

A We have a plan to examine these in detail, site by site, when we know which ones are likely to be used --

Q Yes .

A But we have not done it as yet.

Q Yes. Well now, just one or two other questions; you, and perhaps this is why Mr. Templeton went out of his way to congratulate you. You have made efforts to measure the effect of noise and disturbance on bird populations in designated areas, and I note in the areas that you examined the only species that existed in sufficient numbers to provide a study of any proportions was, what's it called, the Lapland longspur?

A This was the case in two of our studies, yes.

Q And you also did a snow geese study, I take it?

A Yes, sir.

Q Well, now, dealing with the Lapland longspur, that is a little brown bird, isn't it, rather like a sparrow?

A Approximately, yes.

Q Is there any evidence that it is an adequate indicator species? Bearing in mind the hundred species that may exist in the terrain? Or were you just forced to take it because it was the only one there were sufficient numbers of?

A We took it because it was -- there were enough of them that we could readily analyze the data. We have of course information about other species in the same area, and they didn't show any radical change that might lead us to suggest that some serious consequences were arising, but we couldn't put much faith in those results, simply because there weren't enough of those birds in the area.

Q But I take it that you wouldn't suggest to this Inquiry that the Lapland longspur is in any sense a particularly suitable indicator species?

A It is probably suitable for finch-like birds, but certainly not for shorebirds or other species.

Q And you would agree with me then, would you not, that it is -- one has to be prudent and very careful in extrapolating those results

to other species?

A I would agree.

Q And I take it that you have been very guarded in your suggestion that what is true for the Lapland longspur is necessarily true for anybody else?

A I think that is correct, yes.

Q And wouldn't it be fair to say that innovative and useful as these studies are, they are very preliminary in terms of their results?

A I wouldn't go quite that far. THe experiments we did in respect to noise provided by sound simulators, both on geese and on nesting birds, indicated that there is a zone around these stations, where there will be an impact of varying degree, about that, for most sites of compressor -- that have been selected so far for compressor sites. The total amount of that impact is not likely to be significant, simply because the area is not large enough. If the effect were to be, say, five or ten miles in radius, we would have to look at it again, but with a maximum of, say, two and a half mile radius and twenty-five square miles in total affected, the number of birds in that area is quite large but we have not -- our studies do not indicate that the loss of that is going to cause a significant long-term effect on the birds that we have considered. Now, that is compressor stations.

Q Yes.

A As far as activity through human presence and through aircraft, we fo that there was some effect on Lapland longspurs on other birds, and this leads us to believe that there probably would be on other birds as well. Now, the aircraft activity and the human activity not confined in the manner that the compressor are confined, and so we consider them to be much more significant.

Q I take it that in aircraft tests you used a 185 and a Bell 206, is that correct?

A To a large measure, that is correct. In our geese experiments we also noticed the effects of other types of aircraft as they were flying over.

Q Yes, I don't advan this as any criticism whatever, but were you that these were not the kind of aircraft that Gas would be utilizing?

A Yes, I think th -- that we were aware of that. Although, at the time we did it, the determination as to what typ aircraft would be used was not made. In fact, not sure that it is made yet.

Q Well, no, but w and it is to that issue that I want to bring yo know in a general way that Arctic Gas will be fixed wing aircraft, helicopters and hover craft do you think it would be useful to test the variou

types of these craft in order to assist Arctic Gas in deteriming from an environmental point of view, the aircraft that did the most modest disturbance damage?

A We have some data on that from the goose experiments and it was determined that the Twin Otter, for example, caused less disturbance than other aircraft of its size. So, in our view, a Twin Otter, -- we would view a Twin Otter favourably over some other aircraft.

Q Do you think that it would be useful to perform tests on other kinds -- or with other kinds of aircraft, and particularly with hovercraft? Or large helicopters?

A Yes, I think when it becomes determined what types of aircraft Arctic Gas would like to use, then we would like to run tests on those, yes.

Q I would like to go at it the other way, rather. Wouldn't it be helpful if you performed your tests on a variety of aircraft and assisted Arctic Gas in selecting the appropriate ones rather than simply reacting to their choice? You might be more persuasive that way.

A Perhaps if we met in the middle. There is no point in our testing aircraft that they are never going to use.

Q No.

A On the other hand, if they gave us a list from which they would select, then we could go at it that way.

Q I take it that there would be no trouble in doing that, Mr. Hemstock, would there, as you moved toward final design?

WITNESS HEMSTOCK: Well, I don't think we are interested in testing a whole lot of aircraft that we really have no intention of using --

Q No, no, no, but --

A -- we are --

MR. MARSHALL: Let him answer the question. He is trying to give you an answer.

A We would expect from the information I have now, to use essentially the Twin Otter as a service aircraft, and a very light aircraft, probably a Piper or something of that sort, for the routine pipeline inspection. I would think that other than construction when there would be heavy aircraft at certain airstrips during the wintertime, that that would probably be the -- essentially the varieties or models of aircraft that we would be using.

MR. SCOTT:

Q I think what I am concerned about is the aircraft that may be utilized in the staging process and the aircraft that may be utilized in the operation and maintenance period when major repairs are required, and the hovercraft.

A Well, the matter of major repairs, I really don't think that that is that important in the overall, because on the basis of

statistics and so on, we would expect that the possibility of failure would be very remote and so you are looking at perhaps a situation every several years, maybe every eight to ten years, and the support aircraft that would be used then would probably be used because they are available rather than because of their pros and cons from, say, a noise standpoint.

Q Dr. Gunn, doesn't your knowledge of Hovercraft raise some concern in your mind, bearing in mind the noise they emit and the air they circulate when passing along the shore?

WITNESS GUNN: I think we'd have no objection to the use of Hovercraft during the winter period. We would have quite strong objection to the use of Hovercraft during the summer over some areas.

Q Dealing with peregrine falcons, you have told us that you think the construction solution to peregrine falcon problem has to be a site specific one but you estimate that the sensitive areas is approximately 2.5 miles. Do I have that correctly?

A That's what we have said, yes.

Q Isn't it true that the falcons feeding on small birds have a hunting range that is substantially wider than this?

A Yes, I think that the 2 1/2 mile radius is an unsatisfactory figure, really, because we don't know enough yet about the habits of peregrine falcon. It's clear that peregrine falcons will defend an area at least of a one-mile radius around the nest-site. That is they will drive out other peregrines that come into that area, and I think this is an extremely sensitive area for them, but that one mile radius is obviously very important to them.

Q Well, is it your view

that before a prudent rule can be developed that more work has to be done on the hunting areas of the peregrine falcon to measure it's sensitive area for it?

A Yes, I was going on to discuss that. The situation is usually that the falcon is nesting on a cliff face, something of that nature, a ledge on a steep valley side or cliff face, but that in order to find food it goes -- it leaves that and may travel some distance to find it, and the type of food that peregrines eat is largely ducks, it catches ducks, shorebirds and some certain percentage of smaller perching birds; but largely ducks and shore birds such as sandpipers.

Now the important thing in this regard is what -- where that hunting area is for any given pair of falcons. It may be two miles or five miles or ten miles away, and the birds need an avenue from the nest-site to that area. But there has not been sufficient study of peregrine falcons in the wild, to tell us much about those hunting areas, even to give us a general idea about what they consist of and how big they are, and how far birds will travel to reach them. So we don't think that the hunting area simply can be described as describing a large circle around a nest-site. There is some directionality to it.

Now, the difficulty in studying these birds to find out this information is that in the first place they are very rare and sensitive so that Canadian Wildlife Service feels that if the work is to be done, they should do it themselves and I agree

with that, because it's a real responsibility to go in and do such a study. However, the work has not been done yet but I understand it is being planned. The Canadian Wildlife Service has plans to do this, particularly up near the Mackenzie Delta in sensitive areas and I feel it's very important that this work should go ahead. It will mean a great deal to us if we know that and we can extrapolate from their studies to other similar peregrine falcon sites.

But we need to know it soon and it's always a problem getting funds to do this kind of work because most of the money goes to the species such as we mentioned before where you can put a precise dollar value or try to put a dollar value on the birds because they're hunted. These peregrines are not hunted so it's hard to get money for them, and I certainly hope that while I support the idea of a balanced budget in the government, I hope that in this particular case they will make it possible to have that study done. It will certainly help us.

Q Dr. Gunn, you've measured the impact as best as you can, and I note in your case -- and this is true, I think, of the other panelists - that you're prepared to make your prediction because the construction of the pipeline can be conducted in a time frame, that is in the winter season when the impacts are relatively modest, and I take it that that as Mr. Bayly elicited, is one of the fundamental assumptions on which your prediction is based.

A That is correct.

Q Yes. Now, have you been asked to give any consideration to another question, that is the impact of year-around operations and maintenance, or the impact of sudden or emergency or routine repair work that may be necessary?

A Yes, we have, and we have given thought to that.

Q Yes.

A We feel that if this activity takes place, more than 2 1/2 miles away, there will probably be no serious effect provided we are not unlucky enough to go right through the hunting area.

Q More than 2 1/2 miles away from the peregrine falcons.

A Nest-site, yes.

Q What I would really like to get from you is have you a list of recommendations about the conditions in which operations and maintenance and emergency repair work should be permitted? The difficulty that concerns me is that if, during the construction phase, we go to a lot of trouble to protect the peregrine falcons by routing and winter construction and design work and so on, if a repair is necessitated in that area it will all be wasted. Have you got a series of recommendations that you can give us as to how repair and maintenance and emergency repair can be done so as to minimize impacts?

A My recommendation would

be that normal repairs should be carried out so that the least possible work is done between May 15th and August 15 th. When it comes to emergency repairs, then I see that we have no option there. If there's an emergency, repair has to be done, it has to be done. Now we can presumably there will be environmental inspectors concerned with that and will make on-the-site recommendations as to how to do it best; but in an emergency we have to face the fact that wherever it is there will be some impact on birds.

Q Well, this is not designed to do anything than elucidate the problem, but were you present at Shallow Bay in the first week in September when a dredging operation was to be conducted by one of Arctic Gas' contractors?

A Yes sir, I was.

Q And this was an experimental dredging operation, I take it, because the pipeline has not in fact yet been constructed.

A Mr. Hemstock can correct me, but I believe it was to obtain samples of the bottom in the Shallow Bay area.

Q And I take it that the work was under some pressure because the season was closing in.

A I think that is correct.

Q Now, were there wildfowl present at that location?

A Yes, there were.

Q What kind and in what vdumes?

A The principal type of bird -- species of bird present was the snow goose. They were there in the vicinity in large numbers.

Q Well, were you asked to or did you make any recommendation about this work proceeding?

A We were asked to put a man on the barge to make observations as to what happened. In practice it wasn't possible because there wasn't room for him on the barge.

Q He was the last man on and the first man off, was he?

A Yes, that's right. It's not fair to say that. He was to be flown out to the barge and he could have stayed on during the day but he couldn't have stayed overnight, because the bunks were already filled. We did, however, because we were notified about it, we flew observation flights during the period that the barge was there, to determine the distribution of the geese at that time.

Q Well, did you make any recommendation as to whether the barge operation should be postponed?

A Yes, I think we did.

Q What was your recommendation?

A As I recall, our

recommendation was that in view of the concentration of snow geese, that this was a poor time to do it, to do this particular experiment with the barge.

Q Were you recommending that it should be postponed if possible?

A We were not aware of the engineering circumstances, but in our opinion it was an undesirable thing to stage at that particular time.

Q And did you say so?

A Yes.

Q And was it postponed?

A No.

THE COMMISSIONER: What were they doing with the dredge? I mean, what was the purpose of it. It was in Shallow Bay, I take it, in the vicinity of the proposed route across Shallow Bay?

A As I understand it, sir, it was to obtain samples of the bottom along the cross-channel routing of the pipeline.

MR. SCOTT: I am advised, Dr. Gunn, that in certain instances, geese, and perhaps particularly snow geese are attracted to particular kinds of vegetation, and when they find it, and feed upon it and eat the area clean down to the mud. Are you familiar with that kind of phenomena?

A We showed some slides of that, Mr. Scott, at a time when you were not here.

Q Well, is there any -- what I am concerned about, and it is too bad that Mr. Dabbs isn't here -- is there any concern that this is going to play havoc with the revegetation plans that

Arctic Gas has?

A We have looked at that. We don't think so because the natural vegetation comes back in the following year, and as long as the root stocks are not severely damaged, we would expect that they would survive through to the next year if they are going to in any case.

Q Geese are rooters, aren't they?

A They are, yes.

Q Well, isn't it likely that the natural roots won't be safe?

A I think they will be. If they were to graze on the revegetation on the line, that there would be some damage in some areas and that this probably would have to be revegetated in spots.

Q You see, as I understand the problem, this vegetation is particularly important for the first year or two and after that it is hoped that natural revegetation may work its way through. I also understand that fertilzers will be used and I suggest to you that on the Yukon Coast at least, that is going to make the revegetated areas particularly attractive to geese, in one sense a habitat plus, I suppose, isn't that so?

A You can't say for sure.

Q Are you familiar with any studies done at McConnell River which indicate the methods by which geese select the areas in which

they are going to graze?

A I know that there have been studies there and what happens is that the geese leave the nesting areas and go inland to selected areas where they graze quite intensively, and the areas where they do graze can be seen from the air.

Q Are you aware of any studies which indicate that geese have selected fertilized areas over other areas in which to graze?

A No, I am not aware of that.

Q I take it that any such conclusion would raise serious reservations in your mind about the revegetation program and its likelihood of success on the Yukon coast?

A At the time the geese are going to be there, winter is coming down, the plants have stopped growing and I think largely they will take off -- what they do take off will be the top vegetation. They will certainly root and take some Rhizomes and so on. It would be likely that some damage would occur, but we know that Mr. Dabbs has some experimental plots up there and possibly some experiments might be run, but the problem is I would think you would have to have geese in captivity in order to try it out because you can't control the movements of the wild geese, and then if you have them in captivity, you are really not giving them much of a

choice, so that its' difficult to work out such an experiment beforehand.

Q Now, I take it, whether it be the responsibility of Arctic Gas or not, you regard increased access to bird areas as a principle source of risk, is that correct?

A That is correct.

Q Yes, and I take it that you have done no studies about the potential impacts that may be associated with increased access by way of hunting or bird watchers on foot even, and other human sources?

A Not yet.

Q No. Are you proposing to do that?

A As a part of our plan for monitoring effects, this is one item that I would like to see monitored.

Q Have you made that recommendation -- are you talking about monitoring after the project has commenced?

A Yes, during construction and after construction.

Q Yes, now, apart from what is in your list of recommendations, have you -- and leaving the applicant aside for the moment -- have you any other recommendations about how the dangers of increased access can be minimized?

A This is not something, Mr. Scott, that can be lightly answered. I think it

takes a considerable degree of study and a good deal of thought to work it out. There are no easy answers that I know of and I would be glad to undertake this, but I think that we need to look at it for about at least a month to come up with some reasonable suggestions.

Q Well, I take it, Dr. Gunn, that if you later develop any such recommendations before this Inquiry is completed, you will let us have them in your name so they can be advanced if desirable?

MR. MARSHALL: I take it you are speaking of recommendations to Arctic Gas? I thought when you posed the question initially you were interested in governmental control and what measures the government might take to restrict access and so on.

MR. SCOTT: I refuse at the moment, Mr. Commissioner, to look at the question in terms of who is responsible for applying them. That is something that can be dealt with later. I am interested, from all panelists, in recommendations they may have to deal not only with minimizing the effect of construction and operation and maintenance of the pipeline, but minimizing the effects of those things, which it seems to me, at least, will immediately follow upon it, the principle of which we have been dealing with under the heading, "Increased Access", and whether Dr. Gunn has recommendations for Arctic Gas or not, I would be grateful if he would let us know

if any further recommendations of this type are developed by him, either as a result of his thinking or as a result of this work. Any objection to that?

MR. MARSHALL: If Dr. Gunn makes recommendations to Arctic Gas that pertain to control of access by whomever, we will see that they are provided.

MR. SCOTT: Well, Mr. Commissioner, you see, this is the difficulty. If Dr. Gunn -- Dr. Gunn, I presume would not be invited by Arctic Gas to make recommendations with respect to the risks inherent in increased access because Arctic Gas takes the position, and quite properly, that that may not be their responsibility. That is the fault of the Dempster Highway, or the instinct of people to lurch around the territory, and therefore, I don't want to restrict Dr. Gunn, or Mr. Jakimchuk, or Dr. Banfield, to recommendations that they have made to Arctic Gas. I want to ask them in a general way, and this question applies to all of them, if they develop recommendations that will help the Inquiry to determine how the risks of increased access may be dealt with, that they will let us know so the record will be clear that they have said that this is something that can be done or this is something that cannot be done.

MR. MARSHALL: I don't think that we are necessarily at cross-purposes, Mr. Scott, Dr. Gunn indicated that it would take at least a month to come up with proposals or recommendations, and

I took it you then backed off that and said well, if you do happen to make some recommendations, and I gathered you were assuming that those would be recommendations given to Arctic Gas -- that those would also be furnished to the Inquiry. Whether or not it was suggestions that he was making that would have to be enforced by someone other than the applicant.

MR. SCOTT: Well, Mr. Commissioner, to a certain extent, and we might as well get Mr. Jakimchuk and Dr. Banfield in it, this is what we were dealing with the other day. Arctic Gas, and I think quite properly argues that it may not be responsible for consequent access following construction. That is an argument that can be made at the end of the Inquiry. What I am concerned about is that these experts, if they develop, or if they have in their own mind, mitigative solutions to the increased access problem, that they should let us know what they are now, and then it can be argued whether it is the responsibility of Arctic Gas or the government or somebody else.

MR. MARSHALL: Well, Dr. Gunn has responded to that and he said that he doesn't -- he said that he doesn't and he would want to think about it. Now, as you can appreciate, Dr. Gunn is a consultant, he does work for all sorts of people at various levels of government and so on, and if he gives recommendations to Arctic Gas, I agree we can -- you can ask us quite reasonably to provide those to you, but if he gives recommendations to the Federal Government, that is a matter between Dr. Gunn and the Federal Government.

THE COMMISSIONER: I don't think that's a problem. Can't we do it this way? Mr. Scott, if you want to ask Dr. Gunn to develop these recommendations, then if he's willing, let's ask him to do it.

The only difficulty, it seems to me, that arises is, who is going to pay Dr. Gunn, and I don't really think that's a difficulty if the recommendations you seek to have him develop go beyond what Arctic Gas has asked him to do, then it may be that in the final analysis the Inquiry should pay him. But I don't really see any problem here. What is the problem?

MR. SCOTT: I see no problem, Mr. Commissioner, except the sense I've been getting -- and there's nothing wrong with this -- that from both Mr. Jakimchuk's evidence and Dr. Gunn's and Dr. McCart's that they have excluded from their considerations in making recommendations to Arctic Gas, the problems associated with increased access, because that may not be regarded as properly the responsibility of the pipeline.

THE COMMISSIONER: Right.

MR. SCOTT: I accept that, I don't quarrel with that for the moment. But what it means is that we don't have from them, any thoughts about the way, the risks of increased access can be reduced and I'd be grateful for that even if it means I have to pay for it.

A Well, perhaps I can say Mr. Scott, and speak for my colleagues in saying that

provided Arctic Gas sees no conflict of interest, we would be very interested in following up the matter.

Q Well, I'm prepared to follow it up with each of you, and subject to negotiation , I am prepared to pay for it because I regard it as sufficiently important that experts should make this kind of information available and I presume that Arctic Gas will consider that and will probably have no objection to it.

MR. MARSHALL: We certainly will consider it, Mr. Scott. We would be happy to discuss it with you further.

MR. SCOTT: Well, you can get to work, gentlemen, because I'm sure they'll agree.

Q I'd like to now, Mr. Jakimchuk, to deal with some caribou questions and --

THE COMMISSIONER: Well, since we're leaving birds and going onto caribou, let's stop for tea.

(PROCEEDINGS ADJOURNED FOR A FEW MINUTES)

(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

MR. SCOTT: I'd like to ask you about the bluenose caribou herd. I take it that the environmental maps of CAGSL show their wintering area to be in an area adjacent to, or an area traversed by the pipeline as it moves north.

WITNESS JAKIMCHUK: I think the winter distribution in the past of that herd has come close to the pipeline routing in the vicinity of Thunder River on a very rare basis.

Q Well, you've done -- how many seasons of analysis have you done there?

A Pardon me?

Q How many years of analysis of wintering have you done for the bluenose herd?

A We have not studied the bluenose herd.

Q You haven't studied the bluenose herd?

A No, we have not.

Q But I take it that the CAGSL environmental map No. 12 shows overwintering in the vicinity of Travaillant Lake between the new cross-delta re-alignment and the original line closest to the Mackenzie. You're familiar with that?

A I would like to check that map.

Q It's map No. 12. I take it, Mr. Jakimchuk, that in the area I first

described there is shown on environmental map No. 12 overwintering populations of barren ground caribou.

A There is, that is shown. However, I would like to point out that there is some question at the present time, you'll also note on that map an indication of woodland caribou, and there is some question as to what species those animals actually are, whether they are barren ground caribou, whether they are woodland caribou, whether they are inter-grades, or they have some inter-gradation with the reindeer herd.

Q Well, let's see if we can't just take it step by step. Did you prepare those maps?

A I personally did not prepare this map.

Q So the way we stand at the moment is that the map shows overwintering of the bluenose herd or barren ground caribou --

A Yes.

Q -- in the Travaillant Lake region as shown on that map.

A Yes.

Q Now, are you telling me that the maps further down as you move down toward Good Hope, show something else?

A The map that I have shows woodland caribou range.

Q Well, I'm told that throughout that area there is overwintering of barren

caribou of the bluenose herd. Do you have any knowledge of that?

A I have knowledge from reference works, primarily Kelsall's monograph on caribou, which shows the wintering of the bluenose herd extending to that area from time to time, at periodic intervals.

Q But I take it since you've been working in 1971 it's not been part of your responsibility to monitor or determine the limits of the range of that herd?

A I already stated we have not studied that herd. However, we have carried out aerial surveys in that area and documented recorded caribou which we felt were probably woodland caribou.

Q I've also been advised that in recent years in that area, from Travaillant Lake or from north of Travaillant Lake down to Good Hope the range of the bluenose herd has been moving to the west.

A I have no knowledge of that.

Q Well now, I take it that if map No. 12 is accurate, and further, if the advice I have about the overwintering of the bluenose herd is accurate, that indicates that there will be overwintering conflicts -- I use that in the neutral sense -- between the bluenose herd and pipeline construction in those areas.

A This is a possibility, Mr. Scott, and I would look forward to gathering some further information from Canadian Wild Life Service surveys, recent surveys on the bluenose herd.

I might add also --

Q That's where I get my information.

MR. MARSHALL: If you have some reports or studies, Mr. Scott, might we all benefit from them?

MR. SCOTT: Well, I'm getting advice from Mr. Hawley at present, and I don't know if he's committed any of his observations to writing but we can deal with that later. I think we've made available all the final reports that we have.

Q But Mr. Jakimchuk, at the moment, what I want to get from you, if I can, is whether you have any knowledge as to whether the range of the herd, the wintering range of the herd is extending to the west.

A No, I have not any specific knowledge of that extension but I would add that it has been documented -- the herd has been documented as been wintering from time to time there, and I also understand that the bluenose population has increased markedly since the previous surveys to current ones. One would expect with a population that has doubled or trebled in size that they may extend their range somewhat.

Q That's my next question. Is it your understanding that there has been an expansion in this herd which would naturally lead to an extension in some direction of its overwintering range?

THE COMMISSIONER: We've had the answer to that. Now we've got the question.

MR. SCOTT: Thank you, Mr. Commissioner. Now the record is complete.

THE COMMISSIONER: Can I ask from what size to what size over what period of time?

A Well, it's my understanding that,I think it was in 1967, and I may be wrong on that, that the population was estimated around 19,000; and it's my understanding just based on conversation that it's somewhere in the area of 60,000 animals, so that would be a tripling in the size of the herd.

MR. MARSHALL: Sir, I'm not asking Mr. Scott to go to the trouble of calling evidence on this, but if he has some information through his advisors that would be of interest to Mr. Jakimchuk related to the bluenose herd in this region, I would ask that that be made available.

THE COMMISSIONER: Well, I would --

MR. SCOTT: Perhaps as Mr. Bayly suggested, Mr. Marshall can hire some of my advisors, and in that way we will cancel out our

mutual debt .

THE COMMISSIONER: Well, I think that Mr. Scott has put the position as he understands it to Mr. Jakimchuk. But Mr. Marshall has raised a point, that if we want the fullest benefit of Mr. Jakimchuk's professional experience we owe it to him, you owe it to him to put the theory of your advisors to him and I'm sure it can be done in 60 seconds through the microphone.

MR. SCOTT: Yes, I can do it right now. Our advice is that in 1966 the herd was 50,000. In 1967, a count which may not have been accurate, was 19,000. In 1974, though the figures may not yet be released, the count was 94,000. That's point 1.

Point 2, that these caribou overwinter not only where shown on the map , on map No. 12 of Arctic Gas, but also down toward, as far as Good Hope; and point 3; that for whatever reason the size of the herd appears to be expanding and the western extension of it appears to be expanding.

Q Mr.Jakimchuk, do you quarrel with any of that, or do you simply not know?

A I have no basis to quarrel with that. I find it most encouraging news.

Q All right. Now, I take it that the consequence of it is that overwintering caribou will come into contact with pipeline construction if these facts are correct?

A If they are correct in that winter range has extended to the pipeline routing, there would -- an interaction is expected, yes.

Q And whatever consequences there may be between contact of portions of a herd and a pipeline anywhere else, are likely to be duplicated in this area?

A Yes.

Q And if the proposed Mackenzie Highway were to be completed, that would alter, if I understand your general evidence, the range of disturbance?

A I don't know what you mean by alter the range of disturbance.

Q Well, increase?

A Yes, it would potentially increase disturbance.

Q Yes, but I take it with this rider that the Mackenzie Highway, if it is completed up to the north, will not intersect a migratory route directly as the Dempster Highway does? It will incline to parallel a migragory route?

A I think that would be an important disctinction, yes.

Q And the last thing is that these herds are, overwintering, are likely to be an important food source for the towns of Colville Lake, Inuvik, Good Hope, Paulatuk, and Fort Franklin? This is their herd, isn't it?

A I am just not familiar with the Fort Franklin, but I would agree with the others, yes.

Q Yes, and I take it that to the extent that there is overwintering, we are confronted then with the same range of problems of contact that you earlier discussed in relation to construction on the North Slope?

A That is correct.

Q And would it be your intention as you move towards -- perhaps I should ask what your instructions are, but in view of this, would it be the intention of the applicant, to, as you move toward construction, to monitor the development and movement of this herd as well as the Porcupine herd?

A Well, I don't know what that applicant's intention is. I can't speak for him except within the general framework that he, the applicant has outlined, a monitoring program to try to identify and forestall any serious interactions.

Q Well, if my facts are correct and leaving the applicant out of it for the moment, would you agree with me that this herd should be carefully monitored as well to watch the

development of its range and the risk of contacts with pipeline construction or increased access?

A I would agree with that, yes.

Q Now, let me deal generally with the question of caribou and see if I understand what you have said. With respect to the North Slope, I take it that the particular virtue of the proposed construction scheme, vis a vis the caribou, is that, A), it will be constructed in winter and will not, therefore, interfere with their overwintering ground?

A That is one virtue--

Q Yes.

A -- and we have to qualify that somewhat, inasmuch as we have found some wintering taking place, in the northern Richardson Mountains, so there is a possibility of some interaction there. But that one regarding the winter, the main winter range is one consideration, yes.

Q Well, taking the Porcupine herd, the things that we have to worry about as the pipeline construction proceeds, is, first of all, the possibility of running into overwintering populations?

A That is one concern.

Q Yes.

The second is the possibility of interfering in some fashion with the calving ground, and I think that we heard you at length on that subject.

A Yes.

Q And thirdly, I take, and it is connected with the second, is the importance of ensuring that the migration to the caribou ground is not impeded by construction?

A That is correct.

Q Yes. Well, now, then dealing with the Bluenose herd, one's concern must be the possibility that overwintering is not impeded by the impact of construction?

A Yes, that would be a concern.

Q Well, now, I take it that your fundamental task, perhaps restricted to the Porcupine herd, has been to try and predict, insofar as you can, the consequences of that contact between the herd and construction?

A That is correct.

Q Yes. Now, I would like to suggest to you, Mr. Jakimchuk, that before that kind of prediction can be made, it is important to have a fair amount of hard data covering a number of years, and I would like to just go through my list and see if you agree with what I understand you need to make these predictions in a useful way, all right? First, you have to have some sort of population figure for the herd?

A Yes.

Q In the second place, you have to know something about the pattern of movement

and distribution of the herd?

A That is correct.

Q The third thing is that you have to know the population characteristics in some fashion, that is, its reproduction rate, the survival rate of calves and the mortality of the existing herd elements?

A That is subject to qualification. In other words, one doesn't necessarily have to know that in detail to assess interactions between the herd and construction.

Q All right. Well, if you are trying to develop a causal connection, for example, between a depletion of the herd and the cause of that depletion, I take it you must know, in addition, the natural factors that affect depletion of the herd, such as the presence of wolves, the kind of vegetation they rely on, weather conditions and so forth?

A Yes, that is important information.

Q In other words, before we can predict whether a highway, for example, will deplete a herd, and the extent to which depletion will occur, we have to be able, in some rough fashion to trace the extent to which depletion might occur naturally?

A Not necessarily.

Q Well, that is a big help, isn't it, if you can do that?

A Oh, of course. Any information that one has is helpful in the sophistication of the assessment.

Q Well, now, I take it that notwithstanding the valuable work that you have been able to do since 1971 on the Porcupine caribou herd, it would be fair to say that our knowledge of some of those factors is still, and must be at this time frame, in rudimentary form?

A What factors?

Q Well, the extent, for example, to which we know the reproduction rate, the survival rate of calves, the mortality rate of existing members of the herd, the extent to which we know the precise interaction between the herd and predators, etc.?

A The one area where I would agree with your statement is the mortality and the causes of mortality, particularly owing to predation. We do have indices to those other pieces of information,

Q But wouldn't you agree with me that sitting here in 1975 those indices are inclined to be very rough and generalized?

A I don't think that they're that rough at all. We have on an annual basis conducted composition counts. We have an annual comparison of the percentage of yearlings, percentage of bulls, cows and so on, from which we can extrapolate calf survival. We have a productivity in terms of the number of calves produced per 100 cows, which we carry on annually. They're not that rough, I don't think.

Q Yes, but aren't they inclined to be relatively isolated? Is it possible to say that, "We have had a long enough time experience to make realistic judgments about those factors?"

A What do you mean by "realistic judgments"?

Q Well --

A I can't quite see -

THE COMMISSIONER: Accurate judgments.

A On what, that's my question?

MR. SCOTT: ON mortality, on calving rates, on calving success, that is the extent

to which calves live.

A No, I think we can, based on the 4-year period, I feel we have a pretty good data base on that herd, and more so than for most caribou populations.

THE COMMISSIONER:You're talking about the Porcupines?

A Right.

Q And you're --

A I'm talking about the Porcupine at this moment, sir.

THE COMMISSIONER: Yes.

MR. SCOTT: Q You see, Mr. Jakimchuk, the problem that occurs to me, is that before you can predict the impact with any precision, of a railway, a highway, increased access, a pipeline, on the caribou herd, you surely must have a very good handle on whether the herd in size is stable, whether it's increasing, whether it's decreasing.

A To some extent, yes. It's not absolutely necessary and I've told you that we feel we have that handle.

Q Well now, let's deal with the other experience in North America. I take it that there are on this continent really three substantial experiences which tell us about the inter-action between caribou herds and the works of men. I'm thinking of the 40-mile herd, the Ungava herd in Quebec, and the Churchill Falls herd, the name which I can't pronounce.

A Do you mean the Kaminuriak

herd?

Q That's the one I mean. Kaminuriak, and that in each of those cases we have seen the inter-action between a herd and some work of man, none of them, incidentally, a pipeline.

A I haven't seen that inter-action personally. You know, I haven't had experience in those areas.

Q No, but you know --

THE COMMISSIONER: Whatever the experience may have been, it's well-known to all of you who are professionals in the field, I take it.

A Well, I don't know precisely what Mr. Scott is referring to now.

MR. SCOTT: Well, let me put it to you this way, that we know that the 40-mile herd had experience with a highway.

A Yes.

Q And we know that that led to depletion of the herd of really remarkable proportions.

A Well,we don't know whether that was the real cause.

Q All right, but what we know is that a highway was put in, the herd was there, and for whatever reason the herd dramatically decreased in size.

A That appears to have been the case.

Q It may be hunting, it

may be the highway, it may be any number of things, and dealing with the 40-mile herd you would be in danger of making a prediction about how the depletion of the 40-mile herd occurred until you had a very good handle before the highway was built on whether it was increasing or decreasing, or stable in size and range.

A Not necessarily, Mr. Scott, because as I've referred to in my testimony, there is in North America some controversy as to what caribou declines may be attributed to. People postulate all kinds of hypotheses. In my summary sort of analysis of the Porcupine herd I indicated that I felt that developments -- or I may not have indicated this, I'm not sure now -- but developm ents which provide an opportunity for a kill, and most specifically hunting, have the greatest potential for creating a decline, and I think what I referred to is that,in all of the papers I've looked at,the correlation is not necessarily one of development per se, but the harvest of the population that follows a development, as a result of hunting.

Q Mr. Jakimchuk, that may indeed be true, I don't quarrel with that, but I suggest to you, bearing in mind what you know about the inter-action between herds and the works of man, that is to a certain extent hypothethical. It may be the right hypotheses but it's hypothetical.

A Well, it's more than hypothetical because --

Q All right.

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A Well, it's more than hypothetical because --

Q All right.

A -- there are examples in Alaska, for example, that -- where even in the presence of human development that herds have prospered until such time as mortality, particularly from hunting, has created a decline.

Q Well let me put then the general proposition to you, that you have the 40-mile herd which has decreased in size as a result of something, and there was a highway there. Right?

A Yes.

Q You have the Kaminuriak herd --

THE COMMISSIONER: That's the Churchill Falls?

MR. SCOTT: That's the Churchill Falls herd, which has decreased in size.

WITNESS BANFIELD: Excuse me. Churchill Falls is in Labrador. You probably mean --

MR. SCOTT: Churchill, I'm sorry. Thank you.

THE COMMISSIONER: Churchill River.

MR. SCOTT: The Churchill herd which has decreased in size. That's your understanding, isn't it?

WITNESS JAKIMCHUK: I think it had decreased in size but the most recent information is that it has recovered substantially and it's somewhere in the order of 90,000 animals.

THE COMMISSIONER: Excuse me,

what was the development?

MR. SCOTT: There was a dam built at Churchill, or near Churchill, or near this herd, wasn't there?

A Mr. Scott, I just don't know.

WITNESS BANFIELD: This is what I'm trying to say. The dam is at Churchill Falls in Labrador.

THE COMMISSIONER: Well, as soon as this conversation is ended maybe we can ask you to straighten us out on all this, Dr. Banfield.

MR. SCOTT: Im sorry, Mr. Commissioner, I seem to have it wrong.

Q Is it correct, Dr. Banfield, that the Kaminuriak herd is in Quebec?

A No sir, the Kaminuriak herd is in Keewatin and Manitoba.

THE COMMISSIONER: Well, these animals move around, supposedly.

MR. SCOTT: Q Well all right, Dr. Banfield, I think I'm getting it straight now . Isn't it correct that a railway was built into the north which came into contact in some fashion, neutral, positive or negative, --

A Yes, Mr. Scott, you are finally correct.

Q All right, and I take it that without assigning the cause at the moment, that inter-action has been followed by a decrease in the

size of the herd.

A Are you addressing that question to me, sir?

Q To anybody who can answer it.

WITNESS JAKIMCHUK: Dr. Banfield is more acquainted with that than I am.

WITNESS BANFIELD: Well, of course --

THE COMMISSIONER: Excuse me, Dr. Banfield. Just so that I am in the right province at least --

MR. SCOTT: Well, drag me along with you, sir.

THE COMMISSIONER: -- we are now discussing the herd in Quebec in the vicinity of the Churchill River. You tell me, Dr. Banfield, what herd it is and where it is and what happened.

A Well, I think the locale has moved westward to Keewatin and Northern Manitoba. But of course the railway he's referring to is the Hudson Bay Railway from The Pas to Churchill that was built, I believe, in the '20's, I believe it was the '20's, possibly 1930, to expedite the shipment of wheat overseas. Certainly Mr. Law of the Canadian Institute for Guided Ground Transport would very much deny your thesis that that had anything to do with the decline in the Kaminuriak herd.

Q Well, excuse me, Dr. Banfield, just so that we don't -- Mr. Scott is trying

to get you people to agree that there was a coincidance, a coincidence of human development, access following upon the development of the works of man in one way or another, and the decline of the herd, in each instance. Now, without saying that (b) was caused by (a), did these events coincide?

A Well, in this case they didn't coincide. This is the difficulty because I studied that herd in '48, '49, in fact I made two trips by gas car in December up and down that route from Ilford to Churchill and back, it was very cold, and there were still this '48-'49, there were still numerous caribou crossing the railway. So there was a delayed action. But I do feel that it was a contributing factor because by 1955, I believe, the caribou no longer crossed the railway to the winter ranges east of the railway and from about 1958 to present, as far as I know, they have never returned to that immediate area. But if there is a direct relationship you 'd have to say there was a considerable time lag of possibly 20 years.

MR. SCOTT: Can we, without assigning causes, it appears that there was a coincidence, if you will, between some work of man, and the alteration of that herd?

A Yes, I would go that far.

Q Yes, and as you say in the case of the railway in Manitoba, if there was any connection it was delayed because the caribou for a time did cross?

A Yes, sir.

Q Yes, and that incidentally is the same sort of thing we know about the 40-Mile herd, that for a time they did cross.

A That is true.

Q Yes. Well now, the third example is the Newfoundland herd, or the herd that is in Labrador, and I take it that there there is the same coincidence between, I think a highway in that case and some depletion, or fundamental alteration of the range of the herd?

A Well, I am not familiar with the case that you are discussing. The Newfoundland herd we usually think of as being confined to the Island of Newfoundland --

Q Well, let's take that. I take it that there the Trans-Canada Highway was built and there was, for whatever cause, it may have been hunting or anything else, a depletion in the herd?

A There was a continual decline in the herd in Newfoundland for some time. I

think a number of factors were involved: hunting and roads, yes, and an isolation of a major part of the herd to the south of the Trans-Canada Highway, yes.

Q Well, can't we say then that with respect to the three pre-eminent examples in North America, there has been a sequence of events that have commenced with the introduction of some manmade work and an alteration in the size or range of the herd?

WITNESS JAKIMCHUK: I would like to answer that. I don't think we can say that, because in those days we didn't have the extensive baseline information that, for example, we have been tabulating for the Porcupine herd. There was no followup studies. We are all aware that there are major fluctuations in populations under natural conditions in cases where there are no works of man, and on a scientific basis I don't think that you can really say that, and that is one of the handicaps of biological assessment, is this lack of hard, quantitative data pre and post a development.

MR. SCOTT: Well, you see, Mr. Jakimchuk ---

THE COMMISSIONER: Could I just ask you something. You are rejecting Mr. Scott's proposition on the basis of the absence of scientific data. Now, I take it that you couldn't say that the opposite is true either? You can't plump for Mr. Scott or his opposites who would say, "Well, we assert that there was no impact of a serious and

substantial kind." You are in this position. YOu can't really take a position either way, is that --?

A That is correct, Mr. Commissioner, all I am saying is that Mr. Scott is trying to draw parallels with the human development and I am saying that this is not necessarily the case because the one thing we do know is that fluctuations occur in nature.

MR. SCOTT: Well, I understand that, Mr. Jakimchuk, but for that very same reason, you can't with assurance assert that the decrease, for example of the 40-Mile herd is due to hunting or access. It may be due to something else.

A It is possible, yes.

Q And that is true of the experience in Manitoba and Newfoundland as well because of the lack of data. Everything is hypothetical.

A There is a definite lack of data and a lot of it is hypothetical, yes.

Q So those examples can be used neither to establish that a pipeline will do no injury, nor to establish that the herd has been decreased in those cases by other means?

A Well, we weren't talking about pipelines associated with those other things anyway, and I would agree --

Q Well, then I put it to you, Mr. Jakimchuk, that in dealing with the Porcupine herd, to say nothing of the Bluenose herd, we are really proceeding on the analysis of a first

case. There is no -- not the worst case, the first case -- there is no really useful data beyond coincidence upon which we can develop our theories?

A Oh, I would disagree with that. I think there are useful data and these are experimental data, they are observational data of responses of caribou to various environmental conditions and manmade artifacts and so on that we can apply to that analysis.

Q No, but in making your prediction, and it is your prediction that I am concerned about here, in making your prediction, you cannot rely on the experience of any of the three examples that I have given you, in advancing your conclusion?

A Not in a definitive way.

Q No, and further you can't rely on that experience as ruling out one hypothesis or another.

A We have no case history that has been well, definitively researched, pre and post a major development, and I wish we did.

Q All right.

A Therefore, you can't entirely rule uncertainty out. However, I refer you to the analysis that we have conducted, and the information over the years to give the basis by which we have come to our assessment.

Q Yes, but your reasoning

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is all inductive and related to your analysis of the Porcupine caribou herd itself. There is no experience to go on anywhere else that is meaningful.

A Oh, yes, there is experience on many of the elements we are concerned about with respect to the Porcupine herd in Alaska, for example. There is, you know, there are human activities in the range of other caribou herds in Canada.

Q Well, let me put it to you this way. Bearing in mind what is known, isn't it prudent to be very careful about making a prediction relating to impact based on four seasons, or three seasons, I guess, is it, or four?

A It is four, -- getting to be, well, five seasons actually.

Q Isn't it prudent to be very careful, bearing in mind that there has been a sequence of events in other cases, that has caused trouble?

MR. MARSHALL: I don't think that he can respond to that, Mr. Scott. I think we just established that scientifically they are not able to say whether certain events cause trouble or they did not.

THE COMMISSIONER: Well, no, but Mr. Scott is simply saying to Mr. Jakimchuk, given the lack of information that we have about these three previous occurences, is Mr. Jakimchuk satisfied that it is safe to make the prediction about impact

with respect to the Porcupine herd, when we have four, perhaps five years of observations recorded. Now, that is what he is driving at, I suppose.

MR. MARSHALL: I don't have any objection to that.

THE COMMISSIONER: What do you say to that?

A Well, the first thing that I would say is the statement that we have only four or five years, actually denigrades somewhat --

THE COMMISSIONER: No, "only" it's not prejurative, I only say five as opposed to only 25.

A Yes.

THE COMMISSIONER: Leave "only" out.

A I refer to most animal populations that are dealt with and decisions are made on and are often based on much less data than that. I would agree with Mr. Scott that it is prudent to question the likelihood of events and it behooves us to carry out as cautious analysis as we can and that is the basis, sir, for many of our recommendations, our fundamental recommendations and the basis for many of the studies that were conducted.

MR. SCOTT: Let me suggest this to you. If you take the 40-Miles herd, however its depletion may be have been caused, you see something of the potential magnitude of error, don't you? - I mean, a large herd reduced to almost the fringes of

existence?

THE COMMISSIONER: The magnitude of the risk?

A Well, there is all kinds of possibilities for affecting mammal populations in the wild and there are some very high risks, I suppose, but I can't quite see that example, Mr. Scott, because you are trying to get me to agree to your suppositions regarding the 40-Mile when there was historically a paucity of information on the total dimensions of that population. When we are talking about highway developments, when we are talking about a number of other factors such as hunting, when we are talking about the possibility of interchange between that population and the Porcupine herd.

MR. SCOTT: Well, Mr. Jakimchuk really what I am engaged in is emphasizing the importance of caution. I suppose if in 1850 I had predicted the extinction of the passenger pigeon which darkened the skies of North America in the migratory season everybody would have said that I was crazy, but it is now extinct. What I am saying to you, is that the range of risk, if you only take the 40-Mile herd as an example, is very, very great indeed.

A There are a number of factors that can deplete a population, yes

Q But we can no longer conclude that because there are 100,000 or 200,000 that extinction in a couple of generations or a generation is out of the question.

A Of course not.

Q Of course not. All right, so that's the magnitude of the risk, and as I say in predicting the viability of that population, with essentially five years, and the data, one has to be very prudent.

A If you're trying to make a prediction for all activity for all time, most certainly

Q All right, and that is the next --

A But once again, as I've stated before, we were concerned with those aspects relating to a gas pipeline.

Q And I take it that dealing with both the Porcupine herd and the bluenose herd, because it was not your business quite properly to measure the impact of the Dempster Highway, or to measure the impact of a completed Mackenzie Highway, but was only your duty to measure the impact of a pipeline and its right-of-way, that if you take all those factors you would not make any prediction about the viability of these two herds.

MR. MARSHALL: I'm sorry, take all what factors?

MR. SCOTT: If you take those three factors and let's be realistic, those may be the factors that ultimately we will have to deal with. But if you were obliged to take those three factors into account, you would not be in a position in prudence

to make any prediction about whether the Porcupine herd would survive, or about whether the bluenose herd would at least survive as far west as it now appears to be going.

A If I -- I have no way of anticipating what might happen with respect to say highways, or kill, or subsequent development, and under those conditions I wouldn't make a prediction on the viability of the Porcupine herd, unless I had some control over what those developments might be. So I would have to agree, I can't tell you what it will be like in the year 2000, for example.

Q No, but if the two highways are completed by 1980, you don't -- and I don't mean any criticism of this -- you don't even dare to predict what will happen in 1980.

A Well, I could probably take a stab at it if I knew what management policies would be invoked with respect to the herd.

Q All right.

THE COMMISSIONER: Could I just go back for a minute, Mr. Scott? I'm awfully sorry, but the three herds that have been discussed are the 40-mile herd, the herd in Manitoba, and the herd in Newfoundland. Now, there are two herds that seem to have been overlooked in all of this, if they do exist. The word "Ungava" was thrown around rather loosely, and am I to understand that it isn't suggested there was a herd there that was depleted by the impact of man, and then this Churchill thing, I take it that we

can just eliminate Churchill Falls and Churchill River and it was Churchill, Manitoba that --

MR. SCOTT: The Kaminuriak herd was in Manitoba -- in the Northwest Territories, and there a railway was built.

THE COMMISSIONER: Right. I understand that.

MR. SCOTT: There was a Newfoundland herd and a Trans-Canada Highway in Newfoundland. I understand there was also a development about which I don't have precise information, an inter-action, if you want, between the Ungava herd in Labrador and the development at Churchill Falls. I haven't put because I don't have any precise information.

THE COMMISSIONER: Oh, I see.

MR. SCOTT: It involved, I think, the flooding out of the calving ground.

THE COMMISSIONER: O.K.

MR. SCOTT: Q But I take it, Mr. Jakimchuk, just so I can leave it, that because you're not able to deal with the Mackenzie Highway or the Dempster Highway, and because you don't know what, if any, management policies may be implemented to mitigate the effects of those highways, you are in no position to give us any evidence about the total picture for the Porcupine caribou herd or the bluenose herd, in 1980, 1990, or 2000.

A I am not with respect to other developments which I can't foresee.

Q And so what it comes down

to is this, that if you -- that you're essentially saying to us, and I don't make any criticism of this, these are your terms of reference -- that if you put a string across a football field the herd will survive.

THE COMMISSIONER: You've got to bury the string.

A Well, Mr. Scott, we have gone into great length in elaboration that suggests that something more than a string across a football field; you know, our concerns are simply not a right-of-way. We have done studies of deflection, we have carried out noise disturbance studies, we have plotted migratory routes, we have recommended a coastal route, but I wouldn't want you to think that our approach was as simplistic as a string across a football field.

MR. SCOTT:

Q No, that's a roundup question and I shouldn't have expected you to answer it. Now, one other matter. I take it that as a general principle we may assume that a reduction in range, particularly of winter range, will lead in due course to a reduction in population.

A No.

Q Why not?

A Well, that depends on whether the population is at saturation or not. It could well be that a population has not exploited the full potential of the winter range.

Q Well, with that proviso aside, is my proposition correct?

A Not necessarily. We get into, you know at extreme limits, yes. If you eliminate all winter range you eliminate a population; but there are many,many other factors that come into play in the realm of population dynamics such as intra-specific behaviour and intra-specific behaviour that is -- it's an argument that has gone on since time immemorial in biological circles,as to what controls populations, and in some cases it is winter range; in other cases it is not.

Q Well, let me -- obviously there are a variety of causes for a decline of population

A Yes, there are.

Q And I ask you not to consider them in general terms at the moment but I say to you that assuming saturation, the reduction of a range is going to lead to a reduction of population.

A If you assume saturation -

Q Right.

A -- I would say that's a fair statement.

Q And I also understand that the reduction of that range may be delayed many, many years.

A I don't understand you.

THE COMMISSIONER: It may take place over a period of years.

MR. SCOTT: It may take place not at once, and over a period of many years, and the

40-mile herd is my example. There the highway was built and the caribou for a number of years crossed the highway, and then they stopped.

A I believe they're still crossing it.

Q Well, Dr. Weedon said they stopped in, I think, 1972; but you're aware of the concept of sort of delayed reaction provoking a reduction in range.

A Oh, I'm aware of that as a concept. If you're talking about a progressive attrition of range over a span of time reaching a critical point, I can agree with you. I will cite the case of Bighorn sheep, California Bighorn sheep, where this type of thing has occurred.

Q All I'm saying to you is that if a project in the Northwest Territories is constructed, it may be that it will not lead to an immediate reduction in range, but may lead to a reduction in range over a long period of time, even though the project remains the same.

A That's a possibility. It's a possibility, depending upon the type of the project, and if it is one that has potential for influencing range.

Q So that for example it may be that in Manitoba the range reduction caused by the building of the railway did not begin to have effect for many years after the railway was built.

A Well, this is a possibility

but I've already said that I don't have a personal knowledge what really happened there.

Q Well, in the same way with the 40-mile herd, the construction of the highway may not produce immediate effects, but over a number of years may lead to a reduction in the range

A You must be talking about utilization of a range rather than the reduction of a range.

Q All right.

A This is a possibility, yes.

Q So that we can have no confidence, I take it, that simply because the pipeline crews are in there for two years and then out forever, that that may not reduce the utilization of a range.

A Now you've gone from a highway and you've gone to a pipeline.

Q Right.

A And I can't accept that quantum leap.

Q Well, what --

A I think there is a considerable basis for a confidence that basic patterns will be maintained.

Q Well, what is your evidence for that?

MR. MARSHALL: You didn't let the witness finish his answer to your question.

MR. SCOTT: I'm sorry, I didn't mean to interrupt, I'm sorry.

A We have seen, for example, a consistency to a large extent in distribution and annual movements of the Porcupine herd, in the areas where there has been human activity, native villages for example, the Village of Old Crow, Arctic Village in Alaska; the winter road in the Eagle Plains; seismic activity south of Old Crow; and in the course of these types of activities we have seen the maintenance of a basic pattern. So we have some imperical evidence on which to rely.

Q Well, let me put this proposition to you. On some sections of the route for one year, in some sections of the route for two years, there is going to be a clearing of the right-of-way, extensive construction with heavy equipment, the marshalling of supplies and gravel mining and a host of supportive industries located and working -- aircraft flights in and out and all the rest of it. Now, what is the evidence that leads you to conclude that that is something special, and will have no significant effects?

A Are you talking about the Porcupine herd now?

Q Or the Bluenose herd.

A Well, I would have to talk about them separately, actually. For one thing, when it comes to clearing, there will be no clearing along the northern -- the coastal route, along the tundra. Activities will be restricted, construction to the winter period, at which time with rare exceptions there are no caribou there. There will be no conflict with migratory routes. Any summer activities pertaining to compressor stations will be curtailed during calving and within the calving ground. The summer movements of the animals by and large occur south of the alignment. The fall migration takes place at a time prior to construction activity and the marshalling for that fall migration takes place south of that northern alignment. There will be aircraft restrictions imposed in terms of overflight at all times of the year, and complete closures during the calving ground -- I could go on, Mr. Scott, but these are the types of things --

Q You have told us all those things, Mr. Jakimchuk, and what they come down to, and it is the same with Dr. Gunn, and it may be entirely right, is that we can construct this thing in a time frame, in a window in the calendar which will reduce to negligible the impacts.

Now, leaving that aside for the moment, and that may be true, leaving that aside

for the moment, why do you say that the construction of the pipeline of the type I have described is different than any of the other phenomena that we are familiar with?

MR. MARSHALL: Well, Mr. Commissioner, surely that is an essential ingredient of it. A pipeline crew comes in and does their job and they are gone, there is a buried line behind it. NOw, how can you leave that aside? A road crew goes in and builds a road and forever after there is a road with traffic on it. Surely Mr. Jakimchuk in trying to do an assessment of impacts can't leave aside the essential feature of the entire project.

MR. SCOTT: Well, Mr. Commissioner, I would have thought that the answer to the question would be,there is no evidence that the pipeline is different and what saves us here is our time frame, but that is no evidence that a pipeline is in any way different.

A Different than what?

Q Than a road way.

A Well, I would have to disagree. I think the timeframe is very, very important; but a pipeline which is buried, chilled, and revegetated is considerably different than a highway which requires embankments, will carry vehicular travel, and will provide access to human beings.

THE COMMISSIONER: Mr. Scott, you are arguing with Mr. Jakimchuk, and it is an argument that no doubt we will hear again when we come

to final summation, but is this advancing the work of the Inquiry? Go ahead, I don't want to cut anyone off, but I have heard both sides of this thing before and I know you are putting it to Mr. Jakimchuk because you want to test his adherance to this point of view that all of these people have expressed.

I can fairly predict now what his answers are going to be virtually to each question and Mr. Jakimchuk is certainly being consistent, even if his evidence is not in the eyes of your advisors altogether and wholly to be relied upon, but I am taking the trouble to point this out now for the benefit of all counsel, I hope you will curtail the sort of argumentative line of questioning that we have had often. It is important, but once the opposite poles have been reached by counsel and the witness, with each clinging to his side of the thing, there isn't that much point in pursuing it.

MR. SCOTT: I think that I am being ticked off --

THE COMMISSIONER: Oh, no --

MR. SCOTT: And may I just try one more question, then I will go on to something less interesting but different.

Q You say, Mr. Jakimchuk, that, leaving aside the time frame, you say that a pipeline and its construction is different. Now, without trying to predict -- well, you think it is different because you see certain things about it, and

I think it is different; why do you think that the caribou think it is different? What evidence is there? Hard evidence based on experience that they accept your view that it is different?

A Different than a highway?

Q Different than an oil pipeline, a highway, a pipeline above ground, like the one in Alaska with caribou entrance ways --

A Are you asking me how I think caribou perceive a pipeline?

Q I am asking you what evidence is there about the way they perceive a pipeline.

A There is some evidence based on research done by Ken Child at Prudhoe Bay on how they perceive a simulated pipeline with an above ground structure, but I would say indirect evidence -- you are asking me about the perception and I would say that there is no evidence on the perception, but I would say that experience shows that analogous developments to pipelines are coped with by caribou during the course of their activities on an annual basis. I can refer you, for example, to DEW line stations and seismic lines again, this type of thing. Now, that doesn't tell us how they perceive those developments, it tells us that they have coped with them, and that is what I am most interested in.

Q All right, well, I have

exhausted my question and let me move on.

Arctic Gas, as I understand it has undertaken to shut down its operation on the North Slope when calving herds arrive on the slope, have I got that right?

A Prior to the arrival.

Q All right.

So you will be shut down when they arrive?

A Yes.

Q Now, how long, and perhaps Mr. Hemstock can answer this best, what is the lead time required to shut down construction entirely?

MR. MARSHALL: There has been quite a bit of evidence given. Perhaps you weren't here, Mr. Scott, but Mr. Williams was asked about this in connection with Mr. Longlitz's evidence about the shutdown.

MR. SCOTT: Well, what was his evidence about the lead time? I overlooked that.

THE COMMISSIONER: I can't remember. I would like to -- I don't think that there is anything wrong with our being reminded succinctly of --

MR. MARSHALL: No, there isn't sir, it's just that Mr. Hemstock wasn't here and this is a subject that was discussed at some length.

MR. SCOTT: Well, what did Mr. Williams say about it? I am prepared to accept his answer.

WITNESS HEMSTOCK: I don't know what Mr. Williams said about it, but I would think that there are two different situations. First, you asked about the lead time required for shut down, and if the shut down is to be for what we would think just a day or two while, say, a herd went by or where there was caribou in the area, I think that this would be almost an immediate thing, that there would be no difficulty in shutting down very, very quickly. However, if it is at the end of the season and the caribou have arrived for calving, obviously there is going to be no further construction in that period and there we would have to talk with Mr. Williams, and I think it would take probably several days.

Q And I take it that it follows that the travels of the herd will be monitored so that you will get whatever lead time is required in order to be shut down when they arrive?

A That is right and that is the purpose for the monitoring that has gone on and the monitoring which would be going on during the construction, so that we can predict quite accurately when we anticipate the herd would arrive in the vicinity of the construction.

Q And whether it is one kind of shutdown or another, I take it that that means shutting down all engines and motors?

A That is right. In the case of a shut down for the season, I would anticipate that they would attempt to get all of the equipment

back to a future compressor station site.

THE COMMISSIONER: Well, that interests me, a shutdown for the season, because you are going to encounter -- let Mr. Banfield fill you in and then I will carry on. Go ahead.

WITNESS JAKIMCHUK: Could I comment in the interim here?

THE COMMISSIONER: Yes, sure.

A One of the reasons we have devoted a lot of attention to the timing of movements is so that we will have a basis of predicting the likelihood of an interaction and the construction schedule calls for completion of construction by April 30th along the North Slope and the earliest recorded arrival on the calving grounds we have appears to have been this past year of May the 15th, of the caribou. There is a two week lead time. NOrmally the arrival is on the 27th or 28th of May, towards the end of May in any event, so this is one of those windows in time that is a very important one to us. We don't want to rely entirely on the pre-monitoring survey.

THE COMMISSIONER: Well, that window is a good metaphor, I think to use, and the whole thing, the whole construction program on the North Coast is predicated on getting started in the fall, I think Mr. Williams said that he now feels that you can start about November the 1st, he'll have his snow roads in place and continuing right through

until something like, I believe he said April 15th, but I am not wedded to those dates.

Now, this project is to be built on this footing, that the first two years of construction are to build the Mackenzie Valley line, the third year of the pipeline is to lay the supply leg from Prudhoe Bay to the Mackenzie Delta.

Now, if you, and bear in mind that that means that the first two years will be devoted to building a system that in the third year will only be bringing Canadian gas south, and Arctic Gas has undertaken, Mr. Horte was here and he said none of that gas, not one drop will go to the United States, that's for the National Energy Board, but I am just telling you what was said at the time.

Well, that means in the third year of pipelaying the Americans are going to be waiting for their gas. They're already apparently waiting with a certain measure of impatience, we're told , and if Mr. Williams' calculations about being able to work on the North Slope, Mr. Dau says productivity is down to something like 60% per man hour, what you would normally expect in pipeline construction because of the harsh climate, if anything goes wrong there, labor disputes, which are not unknown onthese large-scale frontier projects, some storm event, I think that's a storm but we call it a storm event, any number of things can occur. It may be that you -- not you but the engineers have miscalculated their ability to do all of that within that window in the calendar. If they fail; this is what really concerns me about all of this, I'm sure it concerns you gentlemen; if they fail what's going to happen? Are they going to say, "Well, we'll shut down until the caribou calving is completed and the aggregation", and the aggregation would bring them closer to the actual construction, as I understand your evidence. When are they going to start up again? The following winter? That postpones delivery of gas to the United States by another year or more and what really concerns me is whether this can all be done and someone like yourself steps in and says, "No, I can see the caribou on the horizon so this is it," and New York and Chicago wait another 12 months for their gas.

I guess I'm just thinking out loud here, but that's why the construction schedule and it's relationship to the arrival of the caribou at the calving grounds and the aggregation closer to the coast as they move westward towards the border and into Alaska is so vital, and quite apart from the Dempster and all these other long-range things.

Another thing that concerns me about all of this, and that is that Mr. Horte said that within five years after completion of the first line they will want to loop it. He didn't say on the North Coast, he said that's a possibility. That depends on a great many other things. Looping, I think he made plain, would be confined to the Mackenzie Valley line; but then you'd have this whole project resurrected, so to speak, all of it under way again, the oil people of course want to build their pipeline and the government may say, or one of the projects may insist that they cannot proceed without a road, and then you've got the whole canopy of events.

MR. MARSHALL: Sir, I wonder if I might just comment on some of those points?

THE COMMISSIONER: Yes.

MR. MARSHALL: I think Arctic Gas witnesses, policy witnesses have made it clear that they are giving that undertaking that construction would end, and I think it goes beyond caribou in the sense that the arrival of the caribou would perhaps coincide with the disappearance of the snow when you haven't got a snow road to build from anyway and you're

being shut down by governmental agencies because you don't have a snow road surface to work on, and as I understood the comment, when this came up before, the indication was that while you would be delayed perhaps till November, it's, if you were just six weeks say short of finishing the job, well then you've got to pick up the six weeks it would be later in the fall, it wouldn't be 12 months, it would perhaps be six months.

With respect to looping, the evidence was that this line is over-sized, and if there was any looping it would be deferred back much later.

THE COMMISSIONER: The over-sizing really assumes that you will loop the main line, the main trunkline. I think that was one of the points that Mr. Horte made.

MR. MARSHALL: I think, sir, the five-year figure was when he was being asked about the most optimistic forecast he could think of might possibly give, that's from Travaillant Lake south.

THE COMMISSIONER: Well, thank you, Mr. Marshall. Forgive me, gentlemen, I just want to remind myself occasionally of some of the other events that may occur and that in laying out these windows in the calendar and so on you may ultimately be dealing with forces of considerable magnitude that might not listen to what I say or even to what you say, and that should concern all of us, and that's why the margin for error should be considerable.

WITNESS HEMSTOCK: I might comment that I think Mr. Marshall's quite right. There

are other environmental factors which would co-ordinate that necessary shutdown to about the same time in the spring as the arrival of the caribou. I think there is one --

THE COMMISSIONER: Excuse me, Mr. Hemstock. I understand that your plan is to finish, you'll be gone by the time the caribou arrive. I appreciate that; but if through any series of unfortunate happenings, labor troubles being one that I think is present in the minds of all of us, that isn't taken into account in your calculations. How could you? I don't know how you could, except by adding another 50% on the end, I don't know.

A Well, there is one other factor that certainly will be considered as the project goes forward, and that is the very careful assessment of the scheduling of construction along the North Coast to be sure that it can be constructed in one year. As the experience is gained along the Mackenzie, it might well be that eventually there would be a two-year construction period planned there, beginning in the middle year of the three-year construction so that you have a safety factor in the --

Q Well, except at the moment that --

A That is not the present plan, I say, but that is something that can be considered as a further safeguard for this condition that you have alluded to.

THE COMMISSIONER: Well, at

any rate, thank you for commenting, Mr. Hemstock and Mr. Marshall, and I hope you will feel free, if I engage in any musin gs of this kind again to comment because it's only fair to let you know some of the things that are going through my head, as this discussion proceeds, which I think I follow in its technical sort of side, but it has a larger political side to it. Carry on,

MR. SCOTT: Let me see -- it seems to me that part of the difficulty is that engineers may approach reality from the side of optimism. Regulatory agencies and lawyers may approach it from the side of pessimism, and with that in mind let me just put this scenario to you, if Dr. Banfield will forgive a doomsday scenario.

MR. MARSHALL: Mr. Scott, I don't really think that I can forgive that. I mean, engineers have been here in great numbers, called both by Arctic Gas and by Foothills, and you know, to suggest that they approach things through rose colored glasses --

MR. SCOTT: Oh, well.

MR. MARSHALL: -- wherein we are much more pessimistic or inferring we're much more realistic, I don't think is fair to them.

MR. SCOTT: Well, I hope none of them are offended by that remark. I t wasn't intended to offend them and I apologize if it did. I don't withdraw it.

(LAUGHTER)

Q Let me put this situation, gentlemen, and see if this leads to any conclusions. Let us assume a calving herd of 20,000 come through the mountains and arrives adjacent to pipeline construction, and start having their calves on March 25th.

(LAUGHTER)

THE COMMISSIONER: Don't be offended by that.

MR. SCOTT: I'm not offended. I think the point is that they wouldn't be having their calves and that's a fair observation. They arrive through the mountains adjacent to construction and they hang around there. Now we've already been told that when they arrive, the works are going to shut down, hopefully for only two or three days. But what happens if they stay there? Do I understand correctly that Arctic Gas is going to shut down its project?

WITNESS BANFIELD: Well, first of all, Mr. Scott, I must explain my unseemly chuckle there or mirth, but you know, the gestation period is one of the things that are relatively fixed in life, and the chances of caribou having babies in March is the same as the chance of 20,000 human females giving birth to six-month old children, you know.

THE COMMISSIONER: The same chance as the Olympics having a deficit.

A It's about that risk, I think.

MR. SCOTT: I accept that, but

I take it that you would agree that a calving herd coming through the mountains on the coast on March 25th is nonetheless a calving herd.

A I agree.

Q Yes. Now, what I'm asking is in the face of that eventuality, which is not incidentally as remote as a deficit for the Olympics, because it happened in 1952, according to Dr. McEwan, what is Arctic Gas going to do as a matter of policy?

THE COMMISSIONER: Well, I understood they would shut down the project until the herd had removed itself from further contact with the project.

MR. SCOTT: Well, that's what I heard to be said, but has anybody really considered this eventuality, and if they had, is that promise a realistic promise to the public in view of the time frame in which the pipeline, according to the applicant, must be constructed? Or are there limits to the undertaking to close down, and if there are, what are they?

MR. MARSHALL: Did I understand you to say that someone by the name of McEwan had said this?

MR. SCOTT: Dr. McEwan reported that as occurring in 1952.

MR. MARSHALL: Not to this Inquiry.

THE COMMISSIONER: It may have

been at one of the community hearings.

MR. SCOTT: That is referred to in one of the Canadian Wildlife Service Reports which I will attempt to get for you if you don't have it, and in the second place Mr. Veale referred to it, not that this is an authority, in his cross-examination and as I recall one of the experts acknowledged that he had heard of that observation.

MR. MARSHALL: I don't quarrel with that, Mr. Scott, it may well be, but I wasn't aware.

MR. SCOTT: Well, leaving aside the authenticity of that report, which I will document in due course, what do you say about the posture of Arctic Gas when confronted with that?

WITNESS HEMSTOCK: I think we have said that in the event of a migrating herd coming in contact with the construction, we would shut down, and in the event that there are a few caribou in the vicinity of construction that we would probably continue that construction. Now, what we have to rely on is the advice of people like Mr. Jakimchuk and Dr. Banfield, and try and find out what the impact of construction would be on the caribou.

Obviously, if there is a herd of 20,000 and they are in a fairly confined area near construction or in front of construction there would be no doubt at all that the project would close down. But as Mr. Jakimchuk has pointed out, normally they are fairly scattered and fairly isolated along that portion of the route and if the average was a few animals per square mile, I would think that construction could go ahead.

As Dr. Banfield pointed out the herd would have arrived, but the calving itself would not be underway for a few weeks hence.

Q No, but in approaching

a problem of the dimension that I have described, do I understand that if that problem occurs, to take a concrete example, 20,000 in a relatively confined area, that the project will still shutdown notwithstanding that it happens on March the 25th?

A Yes.

Q All right. Now, Mr. Jakimchuk, I am not clear, and you may have dealt with this before, and if you have, forgive me, but I didn't understand it. What is going to happen when construction crews arrive and there are overwintering caribou present or alternatively when construction is underway when overwintering herds arrive, such as happened in '74 - '75 with respect to the Porcupine herd, or such as might happen with the Bluenose herd?

WITNESS JAKIMCHUK: Well, it is unlikely that in either instance that over-wintering herds would sort of arrive at the time construction is goin g on . They are most likely to be in the general area, although it is possible for them to be elsewhere and gradually drift towards the activity. If that were to occur, it would be detected by the environmental inspection program, part of the monitoring program. The likelihood of contact would be established, that is, the direction of travel, rate of movement, warning would be given to the spread that there might be a problem arising. If it appeared that the problem was imminent, measures would be -- we have recommended, I should say, measures

to protect caribou from encountering in their movement through the area of construction to protect them from hazards such as open ditch, strung pipe, allow them free passage, in other words, avoid -- minimize vehicular travel or curtail it so that they are allowed free passage, and ultimately hope as they are wont to wander around,that they would drift through the area. That is the type of measure that we would recommend.

Q And those kinds of measures I take it will be set out when you come around to draft your general recommendations?

A Well, as a matter of fact they are already set out in the Biological Report Series.

Q Now, what happens in the other case where the caribou are there when the construction crews arrive?

A Well, as I say, that is quite unlikely. In other words, they would be detected before the arrival. We would probably, in that case, and we haven't dealt with that case specifically, employ the same recommendations, if possible try to, you know, suggest a slowdown or a cessation of activity until the caribou moved from the vicinity, but basically employ the same measures.

Q Have any studies been done of the implications of these sort of shoo-away tactics?

A Well, they aren't

shoo-away tactics, they are --

Q Well, diversionary tactics --

A -- letting nature take its course. I don't know of any specific studies on the implications of that.

Q Well, now, just to take you back to the North Slope, do I understand it that if the calving herds arrive, that one of the things that will be required is to fill in the ditch?

A If migratory herds are encountered, either filling or fencing off from a hazardous area is recommended.

Q Well, now, Mr. Jakimchuk, you also said or someone advanced the theory the other day that the overwintering caribou found west of Aklavik and up into the delta that were referred to as existing in '74 - '75 probably were there because they were in effect lazy and found grazing material that diverted them from their migration. I think that someone advanced that theory.

A I may have made mention of that, but I didn't say -- I don't think that I implied they were diverted. I think that I stated that they were taking advantage of an opportunity that presented itself as a result primarily of climatic and snow conditions to avail themselves of the forage.

Q The other alternative hypothesis, I take it, is because of heavy snow they might not have been able to leave that area and

follow their normal migratory route?

A That is a very remote possibility, but most unlikely because fall migrations are generally triggered by heavy snowfalls and caribou are able to negotiate substantial snow depths, and will in fact move away from excessive snow quite readily.

Q In the post calving season and in the autumn I take it that construction and operation crews on the North Shore, on the Arctic Coast, will come into contact with caribou herds as they move east? The people at the staging areas and at Komakuk Beach and so on?

A At what time in the --

Q When equipment is being brought in, when the gravel mining is being done, when the work -- prior to the work season, but when the work preparation season is underway in the autumn.

A Well, most of the caribou at that time are considerable distances south of the alignment in the area of activity. In other words, the onset of summer movements in July culminates in late July and August with the caribou being, by late July, being by and large south of the alignment.

Q Well, let's take barge landings and that kind of operation which we understand is goin to occur in the summer, preceding construction, isn't there likely to be interaction between that

work and post calving caribou herds?

A Well, it is my understanding and I have asked Arctic Gas for some clarification of this. My understanding, what I think you are referring to here is the post calving aggregation and its importance. What occurs in early July and lasts for a very short period of time triggers the extensive summer movements which I have described. It is my understanding that, for example, barge arrival in Camden Bay and activities within the general area of the post calving aggregation will not take place until some time in August.

Q In any event, whatever the facts may be, do I take it that it would be your recommendation, Mr. Jakimchuk, that work should not take place until the post calving aggregation is passed?

A If there was a danger of an interaction between that aggregation and construction activities and other intensive human acitivities, I would not like to see intensive activities take place. But it all depends once again on the location of the post calving aggregation. We have stated and said that we feel that some very strict protective measures should be applied during the time of aggregation and following.

Q Well, now, one other matter. From what I have been able to read, I gather that the reaction of caribou, whether individually or in groups to stimuli, is unpredictable or varied

depending on a whole lot of factors about which we may know little.

MR. MARSHALL: Could you be more specific? Are you talking about noise or aircraft of human presence or --

MR. SCOTT: I am talking about any of those things, that what we know is that things that we expect to terrify caribou don't always do so, and things that we don't expect to terrify them do.

A I wish you would give me an example, I think reactions can vary, yes, from individuals to groups, and from -- they vary according to time of year, the nature of the stimulus.

Q I've heard it said, for example, that such simple and inhuman terms, modest events as walking with crunching feet on the tundra may harass caribou.

A It may harass those in the -- I wouldn't say "harass", it may disturb those in the immediate area. An interesting thing is that caribou, like most wildlife species, seem to be able to identify a danger or hazard such as a hunter on a skidoo, for example, or men with guns during the hunting season, and I think this would vary according to how they interpreted that stimulus. If they had had prior experience, that has been a dangerous one associated with the stimulus, they will respond more markedly than they will where there has been no danger previously associated.

Q Well, what I'm suggesting to you is that not much is with precision known about the reaction of caribou to a variety of stimuli, running all the way from whistling to clicking a camera at the one end, to the use of bulldozers and chain saws at the other. Sometimes it appears to have effects and consequences, and other times it doesn't.

A This is possible.

Q Well, do you see any merit

in an effort to, by scientific research, to attempt to measure the stimuli that affect caribou when confronted by man?

MR. MARSHALL:Mr. Scott, you've given us such a wide range of possible subjects, you know, you're obviously not interested in scientific studies of the impact of clicking cameras on caribou herds. Can you be more precise on the reason they've got to be studied? I mean we'll try to be helpful if you can suggest something that hasn't been studied that should be studied that's a concern to you that we can respond to.

MR. SCOTT: The reason I raised the question is that it has been suggested that -- and I think Mr. Jakimchuk agrees -- that when the extent to which a stimuli causes reaction among caribou it's effect may be modified by sort of habituation process.

A That's correct.

Q All right. Well now, in order to get that habituation process at work we have to know something about the effect of stimuli on caribou.

A It's a very complicated subject, and there are many dimensions ranging all the way from observational evidence to physiological study, for example,and it is desirable, as I stated in previous testimony, to know as much as we can about the operation of those factors, but --

Q O.K., I take it that some

work has already been done on this, particularly in connection with reindeer.

A On what?

Q On the effect of stimuli and the possibility of habituation.

A I'm not aware -- well yes, there has been some work in various locations that falls into that category. I think of some in Alaska in particular, reindeer in enclosures.

Q Well, bearing in mind that I, at least, am dealing not merely with the gas pipeline but with a whole range of increased access disturbances, do you not think that this would be a fruitful direction in which students of the caribou should move?

A I'm sure it would be a fruitful direction in terms of, particularly of academic interest. However, I wouldn't place it as the highest priority on my list, on my shopping list if I could consider all of the possible measures to protect caribou.

Q Well, what's the highest priority item on your shopping list?

A Well, the highest priority item is to know as much as possible about the population, its productivity and health, what factors might impair that population, what the harvest is, and how you can maintain that population in a viable state. I'm interested primarily in the population, its movements, and factors which might cause a particular disruption.

Q Have you heard Dr.

Geist's views expressed on the desirability if possible of developing positive programs so that the industrial works and caribou can co-exist?

A I read that in some of the testimony, yes.

Q What do you think of that?

A I don't think it's realistic.

Q Why not?

A I don't think the -- I don't think it's feasible to attempt to semi-domesticate wild creatures to accommodate them to human activity. In certain cases perhaps this may be feasible, but by and large I don't think it's a realistic approach to the very real and pragmatic problems posed by large-scale development.

Q Do you understand the program as one of domestication?

MR. MARSHALL: Mr. Scott, he might have a better indication if we could have a copy of Dr. Geist's paper, which I understand has been commissioned, so we can look into some of these subjects.

MR. SCOTT: It will be made available, and I think Dr. Geist will be giving evidence in due course, but I wonder --

MR. MARSHALL: Well, if there is a report or study that's been done --

MR. SCOTT: There is no report

or study that has been done. Dr. Geist has, at my request, prepared some information for me which I'm quite prepared to make available and will do. But it's prepared for me; it's not a report or study.

THE COMMISSIONER: Well, at rate, Mr. Jakimchuk, you do not think that any program designed to habituate caribou to the presence of man and his works would be very likely to succeed? You're thumbs down on the prospect of it really working out in any worthwhile way.

A I said that I felt that it's unrealistic. I would certainly, if someone could demonstrate that it might be feasible, I'd be very, very interested in pursuing that concept of habituation. However, it's my feeling that many of these matters are largely unexplored and beyond any immediate prospects for fruition, and as a consequence I would place my emphasis in other areas.

Q To limit the contact between man and beast?

A That is correct. One is, excuse me, any time man meddles with wild creatures he doesn't really know where the consequences will lead him in cases of altering their behaviour. I am not in a position to say whether habituation imposed by man would be a good thing or a bad thing. It may lead to other problems.

MR. SCOTT: Q Well now, you may not be in a position to do so now, Mr. Jakimchuk, but apart from what you told us already, do you have any other recommendations about limiting human activity on the tundra during construction periods?

A Yes, we have said that we feel that activity should be limited to the working area, the right-of-way and the compressor station sites.

Q What I am concerned about is the possibility even though it be the dead of winter or the early spring, that the construction work will attract reporters and news television cameras from time to time and that sort of thing. Would it be your recommendation that that sort of thing should be entirely foreclosed?

A It would depend on the volume of that type of activity. If it involved interaction with mammals that I thought were detrimental, I would say it should be curtailed. If it did not, I see -- I would not place a newspaper reporter in a different category than a construction worker. I could say it is

better to minimize it.

Q Well now, you have given a certain general recommendations about the use of highways. In particular, the Dempster, what do you think about the general proposition that highways that cross caribou migratory routes should be utilized only under a convoy system? Is that a sensible thing to do?

A Well, I don't really know what you mean by a convoy system.

Q Well, a system in which all transportation on the highway was limited to particular intervals, all vehicles in that, let's say, 8 hour interval travelling in sequence right through and then closing the road for 8 hours.

A In the area of migratory routes during migratory periods, I think that would be an excellent way to approach the problem.

Q What about restricting travel on the highway to day-time only?

A Are you asking me for my opinion of that recommendation?

Q Yes.

A Well, day-time is 20 hours a day, 24 hours a day in some locations or in some areas.

Q Well, you know what I mean --

A I know what you mean.

Q Say a 10 hour day.

A It is not as significant

as identifying the likely interaction. Animals travel during the day as well as at night.

Q What do you think of the ethicacy in connection with the highway of no hunting zones?

A The ethicacy ?

Q Yes, the usefulness of no hunting zones.

A I think that would be a useful proposition.

Q Yes.

A Or at least a zone of limited hunting or no hunting zones with at a certain width or distance from the highway.

Q What width were you, would attract you?

A I think anything over 1 mile would impose constraints on many, many hunters. Probably a zone that were five miles would virtually eliminate hunting.

Q Yes, well now, before he left, and I shouldn't perhaps mention it in his absence but Dr. McCart said to me over a drink that he thought it might be useful to prevent hunting from helicopters or other aircraft. That is to make it an offence to -- he was talking about fishing -- have fish in an aircraft and thereby reduce in-migrants who came only for fishing. Is a similar sort of thing useful in your area or in Dr. Gunn's area?

A I think that there, of course, are certain restrictions on hunting from aircraft presently enforced. For example, in the Yukon, one cannot hunt on the same day that one lands in a fixed wing aircraft or helicopter. One can transport meat via these means.

Let me just say about hunting. I am not opposed to hunting per se. Hunting is a legimitate utilization of a resource, providing it does not endanger the resource. I am interested in knowing at which point the resource might be endangered and appropriate controls at that time apply and there are many, many means by which these controls can be implemented but I am not an anathema against hunting per se. It is quite a legimitate activity in my view.

Q Dr. Gunn, do you have anything to add to that?

WITNESS GUNN: A I would like to look at a quota system. Getting back to what Mr. Jakimchuk has just said. It is important to keep the population, whatever it is in a viable condition. That means you can harvest so many animals in a given season.

If you go below that level or go beyond that level, then that population may be in trouble so that however the hunting is done, wherever it is done I feel it is highly important to have a sufficiently good supervisory and regulatory force to enforce a quota system. It has to be kept up to date so that you know how many animals have been killed at a

certain date and how much farther you can go but when you reach that limit then I think it should be cut off, period. That would be one of my approaches.

Q Well, both of you have raised the question and proposed as a kind of solution an adequate game management program. And Mr. Jakimchuk, first of all, I would like to ask you if whether the information you have obtained in your studies is, would be adequate to enable you to develop a proper game management program or is more required?

WITNESS JAKIMCHUK: I think I would contribute a great deal towards development of such a program. I would want to acquire more current information on for example a total kill of caribou. If we are talking about caribou. In order that I could designate an allowable take within the portions of the range that are hunted. I would also think that in the case of the Porcupine herd that international cooperation is very important in this regard because the harvest does take place in two countries.

The information that I feel would be most necessary right now is total mortality figure.

Q Well, Dr. Gunn, do you agree that that kind of additional information is required?

WITNESS GUNN: A Mr. Scott, I would like to give you an example of how the work we have done might fit in with a management program. And it deals with snow geese population we have been studying.

For the past three years we have made a point of trying to estimate the total population that reaches the staging grounds prior to migration south. And if you will bear with me a minute, I would like to follow that through a little bit farther.

In 1973, we estimated a population of 400,000 geese. They had had a good breeding season and there were 1.19 young for every one adult in that 400,000.

In the following year, they had an almost totally unproductive breeding season because of late snow conditions and when they came in that year, in 1974, we estimated a total of 160,000 geese and this may have been a bit low because they were scattered. It might have been 180 or even 200,000 geese but not more than that. And in that group there were only one young, there was only one young bird for every thousand adults.

This year was again a good breeding season and there were 325,000 birds in our view with again a good percentage of young birds. Now, the regulation of the hunting season on snow geese is such that it is difficult or impossible to use information that comes in late, because people have to set dates for seasons and the commercial aspect of it. People want to know well in advance what the bag is going to be and what the seasons are going to be and this applies particularly at the southern end of the range in California. However, we have been -- and the justification for not changing seasons from the limits from one year to another is that it is self-regulating. In other words, when there are many birds, the hunting kill will be high, and it can withstand it. But when there are a few birds, then they are nearly all adults and they will be wary and there will be few of them and so fewer birds will be killed. This is considered to be the way it regulates itself. But I consider that too blunt an instrument for regulating the population and I think we need a more precise way of doing it and I think we need to make use of the information we are developing so that the season, the harvest can be regulated more carefully.

I would like to see, for example, supposing we were to say, that we would like to see 200,000 geese back in the spring to the nesting season. Whether or not it produces a lot of young remains to be seen. If we had that basis, a

minimum of that number of birds, then they could certainly maintain a viable population. If you raised no young and the birds go south, you are shooting capital, you are not shooting interest, and I don't think that this is a very good way of managing a re source. So I would like to see the information we are gathering at that time used and I would like to see the Canadian Wildlife Service to further their good relations with the U.S. Fish and Wildlife Service and the State of California to be more precise about their regulation of this population.

NOw, one of the objects of this exercise is to get gas to California and I think that there might be a little leeway in regard to one of these resources which is being affected by it. That is a long story, but --

Q Leading to blackmail -- Well, let me see if I can put the difficulty that I see, squarely before you without considering who is responsible for what. The Canadian Wildlife Service and the Territorial Government have very limited staffs and resources at the present time, and whether that is good or bad, they are confronted at the present with an area that is virtually wilderness and unopened. I think that can be agreed upon, can't it? There is not too much activity over much of this route at the present time, apart from the communities. Any disagreement with that?

A No.

Q So, at the moment there

is no pressing need for -- let me put it this way, if it weren't for the image of development, and I am not speaking only of Arctic Gas, I am speaking of highways and everything else, on the horizon, there would be no need for a sophisticated game management plan as such in large portions of this Territory, there is no doubt about that, is there?

A No, I agree.

Q All right. Now, what we are confronted with is the building of a pipeline and what will follow upon it, and it may or may not be Arctic Gas's fault, will be increased access and further development, and let me put it to you that all this will happen, let us say, by 1985 at the outside, are you with me so far?

A Yes.

Q And what will happen is that vast regions of territory presently unopened to the public will become open to them.

A Right.

Q All right. Now, isn't it obvious that in order to meet that problem, a crash program in developing the data and the studies for a game management plan is essential, or there will be chaos?

A I think if you are considering, as you are, the combined impact of one or more pipelines plus a highway, and particularly because of the highway, I would agree that you need to know the details of the populations you are

dealing with and you need to have an adequate force to follow your studies and to enforce such regulations as are laid down.

Q And looking at it practically, if this pipeline is to be built on schedule and the increased access will follow it, the time is short?

A The time is short.

Q Yes, do you agree with that, Mr. Jakimchuk?

WITNESS JAKIMCHUK: You've covered a lot of ground, Mr. Scott, and I don't know whether I can agree with all the steps along the way. If you are talking about all the developments that might occur, I would agree with you. If you are just talking about a pipeline, there are certain points that we should clarify, such as the access thing.

Q No, I am talking about what follows upon a pipeline.

MR. MARSHALL: He is hypothesizing the situation with extensive development.

MR. SCOTT: Extensive access. Well, now, what I am suggesting --

A Just a moment, Mr. Scott, the one thing that I would say, is that you have already got the alternative, say, with respect to game management, of simply by arbritary fiat curtailing hunting period, and that wouldn't

require you to have a knowledge of the hunting kill and all of these other factors, but that is not optimum resource utilization.

Q But what I am coming to, someone says in their prepared statement, and I have no doubt it is true, that you people are in terms of data, the current experts, because, with some exceptions you have been extensively engaged in this work for Arctic G as for many years. Now, with all due modesty isn't that obvious?

WITNESS GUNN: I would say the Canadian Wildlife Service is doing a great deal and are very knowledgeable in this --

Q What I'm leading to is this. Don't you think that it is a prudent use of manpower and expertise if we were able to permit you gentlemen to assist in the development of programs and data-gathering, leading to the formulation by government of a game management plan?

MR. MARSHALL: You're really asking them if they should be hired, and on their behalf I suppose I can accept the invitation, Mr. Scott, but --

MR. SCOTT: Well, that's all I was asking for, so I'm content.

MR. MARSHALL: They are not really in a position to say that the Canadian Wildlife Service or the Government of Canada should retain their services so that these things can be worked out by the agencies having the authority and the stature to look after them.

MR. SCOTT: Well, the point very simply is in terms of the urgency of the problem and the necessity for the government agencies to develop a game management plan, Isn't it obvious that the kind of work you gentlemen have been doing in gathering data and making studies should continue and must continue before any plan can be developed?

MR. MARSHALL: Well, I don't think you can ask them that question, Mr. Scott, with respect, because you're talking about, not just pipeline, you're talking about many other things and you're talking about development of plans by governmental

agencies and these people assisting in that, and it takes them a little bit beyond their retainer.

MR. SCOTT: Let me come to the next question.

Q Would Arctic Gas be prepared to sponsor such a program so that all resources can be turned to the development of a game management plan at the earliest possible date?

THE COMMISSIONER: Excuse me, Mr. Scott, are you saying would Arctic Gas be prepared to do something on the face of it the government ought to be doing?

MR. SCOTT: Well, Mr. Commissioner, I don't -- that's an argument, of course, as to whether the government ought to be doing it. If nobody else will do it, government ought to be doing it, there's no doubt about that. What I am really saying is that the consequences of industrial development should not fall necessarily entirely on government, it should also fall perhaps-- and this is an argument -- on those who benefit from that development.

THE COMMISSIONER: I see that, but what you're really asking Mr Hemstock and his consultants to do, is to agree that this is just the first step in continued development, that while they have studied this development, they haven't studied the others, they agree that Arctic Gas ought to study the others and the combined effect. Then aren't they really agreeing that this whole thing should be postponed and is this really fair to them?

MR. SCOTT: Not at all, I'm not asking that the pipeline be postponed at all. I'm saying bearing in mind the time frame in which they propose to construct it, which for the moment I wouldn't alter, and the pressing need for a game management plan, is Arctic Gas prepared to participate, to continue to participate in the development of data so that that plan can be prepared?

MR. MARSHALL: I think Mr. Hemstock can speak to that.

M R SCOTT: Yes.

MR. MARSHALL: He may wish to reserve on it, I don't know.

WITNESS HEMSTOCK: Mr. Scott, I think that I would have to reserve the final answer to what you call a Horte bag, I think, but I could tell you, I think, what I would recommend to him. That is that Arctic Gas would be prepared to continue the kinds of monitoring and research studies which we have undertaken and which we have already indicated are planned for the future, but we would restrict those studies to the impacts that we would anticipate being related to the gas pipeline only, and that we would be quite prepared and pleased to co-operate with any other agency working on other studies and certainly would continue to make our data available. But I believe that we would -- certainly I would recommend that we would restrict our studies to the general area where we anticipate the gas pipeline would have its impact.

MR. SCOTT: Q And Mr. Hemstock,

would you be prepared to go just a little further and recommend that the nature or dimension of those studies should, where necessary, be altered so that they were relevant to the development of a game management plan?

MR. MARSHALL: I don't know what that means. They've already indicated that these studies are relevant to the development of game management plans and they provide basic information on distribution of snow geese, for example, the distribution of caribou migration patterns, all of which are relevant to the development --

THE COMMISSIONER: Well, what Mr. Hemstock is saying, as I understand it, is this. He is really saying, no, he's not going to recommend that Arctic Gas undertake a comprehensive game management plan. He's saying if the authorities, whoever they are, go ahead and do it and they say to Arctic Gas, "On your pipeline we want you to continue the Biological Report series, and these are some of the things we want you to do." He says they'll do it, but the design of the game management plan, and the initiation of it, in light of the Dempster and other developments including the gas pipeline is up to the authorities.

MR. SCOTT: Well, I haven't made myself clear, Mr. Commissioner, because obviously the design of the game management plan must always remain up to the authorities; but I think it is agreed by the panel that certain data has to be developed

till the plan can be worked out. Isn't that fair, Mr. Jakimchuk?

WITNESS JAKIMCHUK: Yes, in talking about game management there is a need for development of additional data.

Q And what I'm really asking is instead of from now on instead of measuring impacts per se, which has been your function to date, is it possible that Arctic Gas will consider, upon your recommendation, turning and measuring the kind of data that may be useful as the government moves toward a game management plan?

WITNESS HEMSTOCK: Well, I would have to disagree that the studies to date have been measuring impact. I think the studies to date have included baseline studies which I would think are important for game management. They have included disturbance studies and I would think that they would be relevant to game management and they have included monitoring, which I think also would be relevant to game management. Now both Mr. Jakimchuk and Mr. -- Dr. Gunn have indicated that additional studies, specific to game management are required. I am not sure that I see the relevance of that to Arctic Gas. I think that that is more likely to be the responsibility of the control agency. However, perhaps you can help me out with a definition of what other studies you would expect.

MR. MARSHALL: I think that I can be of a little assistance. Would you be interested, say, in the Canadian Wildlife Service indicating to Renewable Resources that when they are conducting their surveys of the herd, they also have regard to certain other things which is information that is of interest to the Canadian Wildlife Service, is that the sort of thing that you're --

MR. SCOTT: That sort of thing, yes.

THE COMMISSIONER: That is no problem, surely -- Could we hear from Mr. Hemstock first.

WITNESS HEMSTOCK: I was going to say that that certainly is no problem and we have already on several occasions discussed our program with the C.W.S. for that very kind of input and we appreciate that sort of thing.

THE COMMISSIONER: Sorry, Mr. Jakimchuk go ahead.

WITNESS JAKIMCHUK: Well, we have also had -- I was just giong to say in part what Mr. Hemstock said, we have had a lot of interaction with wildlife agencies, both in Alaska, as well as in Canada, discussions, seminars, distribution of ou r information, We have received personal communications of data that have been helpful to us, we have conducted a co-operative grizzly bear study with the Alaska State Department of Fish and Game and so on, so this type of interaction has been going on for some time.

We have not operated in a vacuum by any means. We give as well as receive.

MR. SCOTT: Well, I will just take one more crack at it and then I will stop. But when Arctic Gas came to this Territory, a game management plan wasn't necessary. In three or four years a game management plan prepared by government, founded on a wealth of data is going to be required if impacts are to be reduced. Now, all I am saying, all I am asking, really, is that will Arctic Gas go further and continue its work, not only until certification, but thereafter so that data for the development of this plan will be available to governmental authorities?

MR. MARSHALL: Well, that is a different point, and I think they have indicated that they intend to do that.

MR. SCOTT: Well, if they intend to do that --

MR. MARSHALL: I think that Dr. Banfield wants to comment on your assumption that there was no game management plan required.

MR. SCOTT: Well, if he doesn't want to comment on it, that is a good question for him.

WITNESS BANFIELD: Well, we have all had considerable difficulty with your questioning and I, probably more than any other one of the panelists. Your attempt to simplify the problem is understandable; you are trying to get to the

basics, but it is an extremely complex and difficult problem and I perhaps understand more than anyone else because I spent eleven years in this Wildlife Service and I indeed spent time when for three years we were responsible, we were the responsible agency for developing game management programs for the Northwest Territories and the Yukon. There has always been a need for a game managment plan just the same as there is always a continuing need for planning, for some goals, some criteria, some objectives. You know, there is so much I could tell you, but it would fill several books, but you know the basic problem is, the frustration that the Wildlife Service has been removed further and further away from the action theatre, from the point of view of either recommending or seeing that any management program is adopted, and even at the beginning that was a problem. It is extremely complicated. It has to do with the political organization of this country and I don't think that oversimplification helps much.

One other brief comment. YOu said that there is a short time that is available to us. This I can't accept. Many of the intervenors have suggested that the government agreed in principle that there should be a gas pipeline in 1972, in which case there has been that period of time. We don't have to start today, if you accept that argument, but I do know that in 1972 they initiated themselves a very large research program that was announced at $5 million and I believe probably the total is more in

the neighbourhood of $35 million, and in fact dwarfs the research program conducted by the Canadian Arctic Gas as an applicant. So I think that there is a shared responsibility surely in this area.

THE COMMISSIONER: You are referring to the environmental social program?

A Yes, sir.

MR. SCOTT: Well, I think, Mr. Commissioner, what I am really asking is an argument. It may be argued before you at the end that the social costs of development should not be borne by the general tax payer, but should be borne at least in part by those who develop, and that was really what the question was related to.

THE COMMISSIONER: Which means the consumers of gas --

MR. SCOTT: Which means the consumers of gas in Chicago and California as well as the consumers of gas in Ontario.

WITNESS GUNN: Mr. Scott, could I add one thing here. The Dempster Highway is not completed yet. The Mackenzie Highway, we have been given to understand, will not be completed in the near future. But if either one is, then I think that the authorities, in permitting that to happen, must be prepared to take the necessary steps to work out the game management and the regulations that will be needed when that happens. I think it is dangerous to go ahead and allow either of those highways to be completed without having the framework for the proper

management of wildlife set out so that it can come into force on either of those occasions or both of them.

MR. SCOTT: Do either of you gentlemen think that the completion of the Dempster should be postponed beyond the construction of the pipeline? Or Mr. Hemstock?

MR. MARSHALL: Well,sir, I don't know that the panel should really be asked that question. It is the government's prerogative to do what it will with these various highways. I suppose they can be asked about the impact assessments, but to ask consultants for Arctic Gas to be saying that the government ought to be doing this or ought to be doing that in terms of its announced programs I think is asking a great deal of them.

MR. SCOTT: The whole Inquiry, Mr. Commissioner, is directed to the question of what the government should be doing with respect to the application. However, if my friend seriously objects to it, I won't pursue it.

MR. MARSHALL: I am not saying I seriously object to it. It is just seems to be putting the witnesses in a very awkward spot to pass judgment on the government policy.

MR. SCOTT: I am not asking them to critize the government policy. I am asking them to measure it in environmental terms. Is that step one in the direction of minimizing environmental impact which they think in view of this gas application should be taken.

THE COMMISSIONER: Well, the necessary --

MR. SCOTT: Or am I just getting tired?

THE COMMISSIONER: The government says that it intends to complete the Dempster in 1977. The Arctic Gas people have a construction program that would entail completion of the pipeline across the north coast in 1980, so if the Dempster is already in place when the pipeline construction occurs which under the current plans it would be, is it better to leave it till after the pipeline is finished. I -- if you gentlemen can, have got a view which you would like to express arising out of your concern about the caribou birds and so forth not about the expenditure of tax payer's money or something like that, then I would like to hear it.

WITNESS GUNN: I would agree with Mr. Marshall that it is the government's prerogative to build it or to complete it or not to complete it.

If they decide to complete it, then they should be ready to grapple with the probable results.

WITNESS HEMSTOCK: I think from an environmental standpoint alone, there is probably reason that the Dempster should not be completed but that is certainly not the only factor. I am sure that the government in looking at all of the other factors and in particular with their planning for the overall development of the north have decided that the Dempster Highway should be completed.

It seems to me that what the panel is saying, that if the highway is completed there are certain mitigative measures that ought to be taken to make the environmental impact acceptable and to assure that the environmental damage is within reason.

THE COMMISSIONER: Well, no one is willing to say "yes" to your proposition. How far have we gotten with this panel? You must be close to the end.

MR. SCOTT: About two hours. Sorry to tell you that.

THE COMMISSIONER: All right, well then, I think it is 5:30 and that is long enough.

MR. SCOTT: I am prepared to sit this evening for a while if --

THE COMMISSIONER: Well, we undertook to the court reporters that we would not and I think that we have to abide by that. We will start at 9:30 in the morning and then we will carry on with this

panel and then with the Foothills panel after that.

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MACKENZIE VALLEY PIPELINE INQUIRY

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IN THE MATTER OF APPLICATIONS BY EACH OF
(a) CANADIAN ARCTIC GAS PIPELINE LIMITED FOR A RIGHT-OF-WAY THAT MIGHT BE GRANTED ACROSS CROWN LANDS WITHIN THE YUKON TERRITORY AND THE NORTHWEST TERRITORIES; and
(b) FOOTHILLS PIPE LINES LTD. FOR A RIGHT-OF-WAY THAT MIGHT BE GRANTED ACROSS CROWN LANDS WITHIN THE NORTHWEST TERRITORIES,
FOR THE PURPOSE OF A PROPOSED MACKENZIE VALLEY PIPELINE

and

IN THE MATTER OF THE SOCIAL, ENVIRONMENTAL AND ECONOMIC IMPACT REGIONALLY OF THE CONSTRUCTION, OPERATION AND SUBSEQUENT ABANDONMENT OF THE ABOVE PROPOSED PIPELINE

(Before the Honourable Mr. Justice Berger, Commissioner)

Yellowknife, N.W.T.

December 9, 1975.

PROCEEDINGS AT INQUIRY

Volume 99

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4299 CANADA WAY,
BURNABY 2, B.C.

Government Publications

APPEARANCES:

Mr. Ian G. Scott, Q.C., Mr. Stephen T. Goudge, Mr. Alick Ryder and Mr. Ian Roland	for Mackenzie Valley Pipeline Inquiry;
Mr. Pierre Genest, Q.C., Mr. Jack Marshall, and Mr. Darryl Carter	for Canadian Arctic Gas Pipeline Limited;
Mr. Reginald Gibbs, Q.C., Mr. Alan Hollingworth & Mr. John W. Lutes,	for Foothills Pipe Lines Ltd.
Mr. Russell Anthony & Pro. Alastair Lucas	for Canadian Arctic Resources Committee;
Mr. Glen W. Bell and Mr. Gerry Sutton,	for Northwest Territories Indian Brotherhood, and Metis Association of the Northwest Territories;
Mr. John Bayly or Miss Leslie Lane	for Inuit Tapirisat of Canada, and The Committee for Original Peoples Entitlement;
Mr. Ron Veale and Mr. Allen Lueck	for The Council for the Yukon Indians;
Mr. Carson H. Templeton,	for Environment Protection Board;
Mr. David Reesor	for Northwest Territories Association of Municipalities;
Mr. Murray Sigler	for Northwest Territories Chamber of Commerce.

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E R R A T A

"berenzia" in the transcript should be "beringia"

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Yellowknife, N.W.T.

December 9, 1975.

(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

MR. SCOTT: Mr. Marshall has some matters that he'd like to raise, Mr. Commissioner.

MR. MARSHALL: Thank you, sir. I have for Miss Hutchinson, the photographs of the slides that were shown by Dr. Gunn, together with copies of his notes which key them to the presentation. I'll file that as an exhibit, sir.

(PHOTOS & NOTES OF DR. GUNN MARKED EXHIBIT 356)

MR. MARSHALL: I would like to request that Foothills supply to Arctic Gas a number of reports which I understand they have listed in some materials that have been filed with the National Energy Board that are relevant to this Inquiry. The first is a Klohn Leonoff Report:

"Assessment of Chilled versus Non-Chilled Pipeline,"

dated January, 1975.

The second is:

"Mackenzie Valley Gas Pipeline Right-of-Way Drainage and Erosion - Hydrology,"

report by Unies, dated November, 1975.

The third is:

"River Crossings Preliminary Design Data"

by Unies, October, 1975.

The fourth is:

"Thaw Consolidation Tests,"

Klohn Leonoff, October 28, 1975. We would like to be

provided with copies of those reports, sir.

MR. HOLLINGWORTH:Can I have a little list, Mr. Marshall?

MR. MARSHALL: I will.

MR. HOLLINGWORTH: You read too quickly there.

MR. MARSHALL: Sir, also dealing with reports, Mr. Scott mentioned on December 5th at page 14719 of the transcript as part of a comment that he was making, he said the following:

> "I suppose I may be filing the report of Dr. Fyles of my staff in due course."

I was wondering whether or not Mr. Scott does have a report of Dr. Fyles of his staff that would be of relevance to the Inquiry, and if so, we would like to have that produced, sir.

MR. SCOTT: That sounds like a mistake in the transcript, which I haven't yet corrected. What did it say Dr. Fyles' report was about?

MR. MARSHALL: You didn't.

MR. SCOTT: I am very careful to see that he isn't allowed to write anything down. We have no report from Dr. Fyles, as far as I know, apart from the assessment/group report, which is already filed.

MR. MARSHALL: Thank you.

MR. SCOTT: If you can tell me the subject that we were discussing then, Mr. Marshall, there might be some other report.

MR. MARSHALL: Well, one can't tell from the context. It's at the time where there was a discussion in the record relating to the F.P.C. staff draft report and there is an interchange between Mr. Hollingworth and myself, and the Commissioner says:

"All right, let's get on with it."

Mr. Scott:

"That's the report of the F.P.C. staff. I suppose I may be filing a report of Dr. Fyles of my staff in due course."

MR. SCOTT: That shows one of the risks of literal reading of the transcript in the middle of the night, Mr. Marshall. That was a facetious comment in which I was reflecting on the fact that the F.P.C. staff report was analogous to the Assessment Group Report under our procedure, and it didn't connote that there was any other report made by Dr. Fyles. It's just an observation on the -- and obvious inappropriate -- an observation on the importance that Mr. Hollingworth attached to the staff report of the F.P.C.

MR. MARSHALL: Thank you. Well, you'll see that I have reports in my mind this morning, so it's small wonder that I raised that.

The next point relates to a discussion that we had relating to work done by Dr. Geist. Now my information, Mr. Scott, is that you had requested of Dr. Geist a report on the physiology of disturbance. If such a report was prepared for the Inquiry, it seems to me it would be of relevance particularly to the work of Mr. Jakimchuk. If there is

a report or study that relates to that subject, could we have it produced, please?

MR. SCOTT: Well, in the first place, Mr. Commissioner, like all counsel, and I'm sure Mr. Marshall is included in this, I have requested a number of people to make memoranda or reports for the Inquiry staff in order to prepare cross-examination and to assist in the preparation of witnesses. I do not regard any of these reports as reports or studies within the ambit of your ruling respecting production. That's the first thing. It seems to me that they're prepared exclusively for the advice of counsel, and just as I would not expect Mr. Marshall to be obliged to produce memoranda that his advisors have prepared for him to enable him to cross-examine witnesses called by others. I treat this report, if you want, in precisely the same category.

However, I am considering whether it should not be released because it's a document of some substance, whether it should not be released to the Inquiry and I'd like to have the opportunity to consider that matter for the balance of the day, in part because I have to discuss the matter with Dr. Geist.

MR. MARSHALL: Sir, I'd like to comment on that because it relates to the point that I wish to bring up in a few moments.

Now, Arctic Gas, going into a number of proceedings, regulatory proceedings, commissioned various reports and studies. Now we've been

ordered to file a list of those and make them available for inspection, and I think we've bent over backwards to try to do that, and to try to make complete disclosure, and I might say in all candor that there have been interminable internal discussions in which lawyers said, "If it looks like a report, and it's written like a report, and it's in an acropress binder, it's a report and it's got to be produced whether you like what's in it or you don't like what's in it," and we've produced reports that were for us and reports that were against us. We tried to live with that rule.

Now, Mr. Scott is telling me that if he gets a report that's prepared for purposes of cross-examination, originally requested for purposes of cross-examination, that he or other participants need not produce that. Now sir, to my mind, I draw a clear distinction between the preparation of cross-examination by an expert consultant to assist in the preparation of cross-examination. That's one thing and I think we all clearly understand that if I get a memoranda from Dr. Clark saying, "You ought to be asking them about these points and these are the reasons and these are the references and so on," now that's an aid to me in my cross-examination.

If Dr. Clark does a report, that's a different matter, a report or a study must be produced and it seems to me that if Commission counsel, commissions a report because of interest in a particular subject, whether or not he intends to

cross-examine my witnesses on the basis of that report, I'm entitled to have that produced. It's a report or study that's relevant to the Inquiry. It's not a question of why the thing came into existence. If he wants simply to get notes to assist him in his cross-examination, indeed that's all he should ask for. If he gets a report or study, it's caught by the rule and I'm entitled to have it produced to me.

Now I make that point, sir, because of an unhappy experience I'm having at the moment with CARC, and I want to get into that in some detail, and perhaps this would be an appropriate time to turn to that.

THE COMMISSIONER: Well, before you do -- go ahead --

MR. BAYLY: It may be the appropriate time, but just for Mr. Marshall's information, I don't want to direct his remarks in this matter, but Mr. Anthony, I spoke to yesterday, will be up for tomorrow morning and if he wants a reply to it it wouldn't come until then, I am certainly not instructed to reply to whatever Mr. Marshall is about to say.

MR. MARSHALL: I am sorry, you are instructed to reply?

MR. BAYLY: No, I said that I am not instructed to reply. I, just for your information was telling you that Mr. Anthony will be up tomorrow, and that isn't to prevent Mr. Marshall from making whatever statement he has to make today, but just for his information.

MR. MARSHALL: Well, sir, I think that it might assist Mr. Anthony if I were to say what is on my mind now, then he would have the benefit of having it in the transcript and he can respond to it in due course if he thinks that it is appropriate to do so.

Sir, you will recall that last week I spoke to you outlining the difficulty I was having in obtaining reports and studies that were set out in CARC's supplemental list which is dated October of 1975. It was filed as Exhibit number 309 on November the 8th.

Now, finally, after a number of discussions with Mr. Anthony, we made arrangements that we would see that the reports got up here and a shipment arrived yesterday, having been forwarded air express from Ottawa by Arctic Gas's office there. It did not, however, contain all of the 26 reports set out in the list I had requested a month previously. Rather, it contained two large envelopes, one for Mr. Anthony which I have not opened, and one for me. Now, Arctic Gas doesn't object to paying Mr. Anthony's Air Express charges, but I do object to getting only 16 of the 26 reports that I have requested.

Sir, I have had a chance to breifly examine the 16 reports I did receive- and I would like to review some of those with you. This report, prepared for the Northern Assessment Group by Ken Sand is dated July 1975. "Production, Transportation and On Shore Activities of Off Shore Oil and Gas Development in the Beaufort Sea". Another report that is undated, "Some Anticipated Effects of a Buried Chilled Gas Pipeline", a preliminary report by R.C. Passmore. A report dated September 1975 by J.A. Spence,"Some Conflict between the Scheduling of Pipeline Construction and Environmental Phenomena." August 1975, Northern Assessment Group, "An Overview of the Status of Enforcement of Environmental Legislation in the Northwest Territories." JUne 1975, J.A. Spence, Northern Assessment Group, "A North Slope Off Shore Corridor for a Gas Pipeline, an

Aspect of Alternative Routing Considerations." February 1975, "Annotated List of Environmental Issues of Relevance in the Mackenzie Valley Pipeline INquiry." An undated report, "The Mackenzie Valley Transportation Corridor Study."

Then there are a couple of reports, Northern Assessment Group. On the bottom it says, "Release permission, October Ottawa, October 17th, 1974", and there are some reports -- this contains summaries and analyses of information contained in the Arctic Gas application, supporting documents with particular reference to regional and community concerns.

Another report on the Mackenzie Highway project of February 1975, "Case History of the Pointed Mountain Gas Pipeline", prepared by Northern Assessment Group, July 1, 1975. Another, March 26, 1975, "Studies Which Estimate the Number of Southern Transients that Can Be Expected in the Delta, 1975 - '85",and then two appendices to that.

Now, sir, I require an explanation as to why these reports have been suppressed by CARC. It is clear to me that they are relevant, and it is clear from the dates on the documents themselves that they have been in existence in some cases for many months. Now, it seems to me that it is obvious that the rules haven't been followed by CARC with respect to the production of these reports and it is clear to me that my

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witnesses have been at a disadvantage as these reports, in large part, have formed a basis of the cross-examination that has been going on . I consider this to be a very serious matter, particularly in light of CARC's public funding for the preparation of these reports, and as well, Mr. Anthony's previous failures to comply with the rules relating to filing of synopsis of evidence, and I am particularly mentioning the Whitehorse experience that we went through at some length with you, sir.

So, I want to leave that on the record and I expect Mr. Anthony to respond to it when he has had a chance to review the transcript and consider it.

Finally, sir, there is another matter that I ought to bring up now. Yesterday Mr. Scott made a reference to a study by Dr. McEwen and he stated that the transcript in the references at pages 14968 and 69 that there were some 20,000 migrating caribou observed in the North Slope in March of 1952. Mr. Jakimchuk has been able to check with his office who have looked up the reference, sir, and he can comment on that. I would ask him to do so now, if he would.

MR. SCOTT: Perhaps before we do so we should have some comment on the other matters because they are not without importance. I think, Mr. Commissioner, respectfully, it is right to draw a distinction between a reporter's study and a memorandum that is prepared for counsel for the

purposes of cross-examination. That is a traditional distinction that I don't think it was the intent of any preliminary ruling, as I understand it, to force every participant to produce memoranda that were prepared for his counsel fo r the purposes of cross-examination. Now, I haven't seen Mr. Anthony, so I don't know whether they fall into that category, but that is the first thing, and I haven't expected that of Mr. Marshall, and I don't expect it of him, and I am sure that he doesn't expect it of me.

MR. MARSHALL: That is clear.

MR. SCOTT: Now, the difficulty turns on this question. When does a memorandum that is prepared for the advice of counsel in cross-examination become a report? The answer very simply is that it never does. It doesn't matter how long it is ; it doesn't matter how it's bound; it doesn't matter how detailed it is, if it is in initiation a memorandum prepared for cross-examination, for the advice of counsel, it never becomes a report, in my respectful submission to you.

Now in the case of Dr. Geist's memorandum, I emphasize to you first of all that it was prepared exclusively for that purpose, the advice of counsel and the preparation of cross-examination.

I also say to you that because Dr. Geist's background is academic, it looks very much like a formal paper that might be submitted to some Royal Society somewhere, in other words it's more than I usually expect -- and I shouldn't say this with my friends present -- but it's more than I normally would require by way of a memorandum of advice.

Now, not on that account but because I think it will be useful to the Inquiry, I propose to consider making it available to the Inquiry, in other words I emphasize I'm considering that not because I feel any obligation under the present rules to reveal it, but because I think it is useful and I will do so, but because of the format in which it is prepared I do not think that I have the right to do that without Dr. Geist's approval. It may contain

comments or observations that would not normally be contained in a report or study, and until I have had an opportunity to discuss it with him, with that in mind, I don't propose, unless ordered to do so, to submit it.

Now, if I receive other memorandum and other reports in the course of preparing myself to participate in this Inquiry, I do not undertake without order to make them available to anybody, but I may say that if they are of interest or importance I will certainly consider in every case doing so, so that all the material will be before you.

That's my submission on that. Now I have nothing to say with respect to Mr. Anthony's report except one thing which I think should be said in his favor. When the Northern Assessment Group was founded, it retained counsel and no doubt Mr. Anthony like all other counsel received memorandum from his advisors as to how he should conduct the case and how he should cross-examine. Because of the funding arrangements with the Inquiry, he was funded -- the Northern Assessment Group was funded to prepare reports or studies. The Inquiry some time ago asked him to provide a list of the reports or studies that they had prepared, and the extent of their completion. That list led to the list to which Mr. Marshall refers. It may be that Mr. Anthony listed on that list of reports memorandum that he received as counsel. Now if he did, that's his business and is fine, but that doesn't make it a report either to come within the report rule.

I think we'll really have to leave that until Mr. Anthony appears and is able to speak to the matter.

MR MARSHALL: Mr. Scott, with respect to the matter involving Dr. Geist's work, I am happy to leave it till tomorrow; if you decide that you will make the report available that will be the end of it. If you decided not to, I would ask that the report be submitted to the Commission to rule on whether or not it ought to be produced.

MR. SCOTT: Well, just for the record I may say that I am advised that Mr Anthony is considering calling Dr. Geist and it has come to my attention that he asked Dr. Geist if he could see that report that Dr. Geist had prepared for me, and under instructions from me Dr. Geist refused to produce it to him, and so that the refusal that confronts us now has been one that has been applied to all counsel, and as I've said, sir, I will look at it and I will speak to Dr. Geist and I will try and let the Inquiry know tomorrow; but I don't regard myself at the moment as under any compulsion to release the memorandum that's prepared for me.

MR. MARSHALL: It may be a rare day tomorrow in that Mr. Anthony and I will find ourselves joining in an application for the production of this document, but we can leave that till tomorrow and see what Mr. Scott decides today.

MR. SCOTT: I'd better get to bed early, I guess that's the thrust of that.

MR. BAYLY: While we're getting

all these things off our chests, one of my concerns has been with the applicant, Arctic Gas' compliance with your ruling regarding the production of summaries of evidence, and I realize the difficulty of this but I note that one of his criticisms of Mr. Anthony was with regard to summaries. We had only the most perfunctory of explanations when we were handed at the beginning of this panel's evidence two additions to that, and nobody asked for an adjournment though I guess that would have been possible; and at the same time we were told that volumes of the Biological Report series had been put in the mail at some point to us, or had been sent to us but were never received, and at the beginning of this cross-examination of this particular panel we were given the volumes from 16 onward, which we had not received up until that date.

I realize there were problems with transportation of materials and this sort of thing, but lest we tar only one with the brush, it appears that there is more than one participant in this Inquiry who is having trouble meeting some of the rulings that have been laid down, and I think the rulings should be met as much as possible, but we're running into problems from everybody including the applicant, who has made the objections to the Canadian Arctic Resources Committee.

MR. HOLLINGWORTH: And to highlight that comment, Mr. Commissioner, I might point out that Foothills list of documents was to be filed sometime ago but appears to have been lost in

the Pacific Western system. So you will be getting that shortly.

MR. MARSHALL: Sir, I've left one matter that Mr. Jakimchuk was going to deal with. I just should comment about Biological Report series. As they are available, we have them in our office upstairs, and they can be inspected by anyone,and efforts are made to get them distributed by whatever means is necessary, given the problems of the postal service to the participants. If we have not reached everybody, I extend my apologies. We'll try to do better in the future.

The last point, sir, was with respect to the -- Mr. Scott's reference to the work by Dr McEwan, 1952, and I'd like Mr. Jakimchuk to comment on that, sir.

ALEXANDER WILLIAM F. BANFIELD
WILLIAM W.H. GUNN
RUSSELL ALEXANDER HEMSTOCK
RONALD DANIEL JAKIMCHUK,RESUMED:

CROSS EXAMINATION BY MR. SCOTT (CONTINUED)

WITNESS JAKIMCHUK: Yesterday Mr. Scott made reference to Dr. McEwen's observations and in the course of doing so used the terms "calving herd" and "migration" with respect to the observation, and I was asked to check into this somewhat further and was able to check with my office regarding that observation.

THE COMMISSIONER: Excuse me, would you just repeat what it was that McEwen had observed?

A Okay --

THE COMMISSIONER: -- was supposed to have observed.

A Well, 20,000 caribou on the North Slope, however, it is described as --

THE COMMISSIONER: During the winter?

A DUring the winter --

MR. SCOTT: On March the 25th.

THE COMMISSIONER: March the 25th.

A March the 25th. Well, in fact, it is quite correct that Dr. McEwen's estimate was 20,000 caribou and just as a point of clarification, however, I think it is useful to distinguish between these and the migrating herd in his survey from Aklavik to Herschel Island, he did estimate 20,000 caribou, 8,000 of which were in the vicinity of the Yukon-Northwest Territories border,

3,000 of which were in the vicinity of the east fork of the Blow River; 2,100 between Blow and Shingle Point; 400 Shingle Point to Kings Point; 200 in the vicinity of Phillips Bay, and on his return, some 6,420 in the vicinity of the Blow River. He did state, according to my information that this was a heterogenous group mainly antlered cows, but composed of bulls, and that they were not migrating, and I might say that this is consistent with our observations of caribou that have wintered on the area and it is quite distinct from the migratory movement of a calving herd, per se, so I make that point of clarification.

MR. SCOTT: Mr. Jakimchuk, let's see if I can follow that up. McEwen's observation of 20,000 caribou in the places that you have described included cows that would calve --

A That is correct.

Q Yes, and let us assume as Dr. Banfield pointed out yesterday, that they would calve after the normal gestation period.

A Yes.

Q Yes. Now, I take it that your point is that you understand Dr. McEwen's observation to be that these herds had overwintered on the North Slope?

A That is correct.

Q Now, I take it what that means is that they would not have to migrate much further to their calving ground if they weren't there already?

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A There are two possibilities. One, that they would calve in the vicinity and one would expect it mainly from the Blow River westward, or that they in the latter part of May, would move into Alaska along the North Slope and calve in that area.

Q Well, this whole discussion arose in connection with the undertaking of Arctic Gas to shut down the appropriate portion of its Arctic Coast works upon the arrival of calving herds, you remember that, do you? That was how the discussion arose.

A Yes.

Q Yes, well, now, this is a case where we have a herd or herds or groups that include calving herds that are there on March the 25th.

A It is a heterogenous wintering group with adult males as well as the cows that are in calf, such as I described for wintering groups that we have documented in our surveys.

Q All right, well, let's take that example. Let us assume, let's take the group of 8,000 out of the twenty and let us assume that they include cows who will calve.

A That is a likely case, yes.

Q Yes, and that on March the 25th they are standing adjacent to the pipeline works. Now, what I am really asking is, is the work

going to shut down? These cows with calves are on the North Slope on March the 25th --

A No, pregnant cows, not cows with calves.

Q Oh, I am sorry, pregnant cows are on the North Slope on March the 25th, either at or moving toward -- ultimately toward their calving ground, is the work going to be shut down on your recommendation? Or do you just shut down a week or two before the calves are actually dropped?

A Well, as I discussed yesterday, the cessation of construction would take place by April 30th in any event and these pregnant cows are,at the time of McEwen's survey, for example, are approximately two months away from parturition. Yesterday I think that Mr. Hemstock elaborated in some detail as to the procedures that would be employed, and as I have indicated, some of these are described in the Biological Report Series, I believe it is Volume V. I don't think that I can add anything to what I have already said.

Q Well, can I direct it to you this way: I understood the undertaking to be that when there were cows in quantities that were pregnant, that were migrating or moving toward their calving grounds, the work would shut down either permanently or for shorter periods as might be necessary.

A That would be correct in the case of migrating herds.

Q Well, why does it make any difference? The objective surely is not to protect a migrating herd. The objective, surely, is to protect the pregnant cow that is going to calve.

A There is a difference there, inasmuch as I have described previously characteristics of caribou movements while they are wintering are much different than during the migration and there are more serious implications, in my view, of an interaction with a migrating herd than a herd that is occupying, grazing and making casual movements over a winter range. I think that the implications are greater for the migrating herd. I think it would be unfortunate to have an interaction between any caribou and the pipeline, however, if it does occur, as it did 20 years ago where animals were on the slope, and as it has in the last two winters, there are measures that will be employed to mitigate for it.

Q Well, do you want to qualify the undertaking in some such fashion as to indicate that you will only shut down, let us say, in the last month of the pregnancy or something like that?

A Well, my recommendation, fundamental recommendation, has been no activity on the calving ground during the calving period. Another recommendation has been that every measure and stringent measures be applied to avoid interfering with or deflecting migrating herds. We're posed with a possibility of some small segment of the total population wintering in the area, and if that occurs it would pose a difficult problem. It's not as serious a matter in my opinion as interference with migrating herds or during the actual calving period.

Now, Mr. Hemstock, as I say, has stated what Arctic Gas will undertake to do and it's my feeling that if that is undertaken, that this is a useful mitigative measure.

Q Well, to wrap it up then, do I conclude that if you observe what Dr. McEwan observed, in the numbers that he observed and with the proportion of calves or pregnant cows, that the work would not be shut down?

A If we observed a concentration, Mr. Scott, that was directly in a path of inter-action with construction activity, under those circumstances we would recommend at the time via our biological inspection a shutdown, if we observed a concentration.

Q Well now, let me turn to one other subject, moose and other mammals. Do you agree, Mr. Jakimchuk, that the right-of-way as it develops over three or four years down the Mackenzie

Valley when grasses and shrubbery and so on begin to grow, will likely become a congregation or wintering area for moose and smaller animals because of the availability of overwintering food?

A No, I can't entirely agree with that. I don't think -- I think there will be potentially more browse available, however I don't think it will be sufficient to induce congregations and to change winter range utilization patterns.

Q I take it that in general terms the pattern, as winter comes along is for the moose to move down into the valley and ultimately in some cases onto the islands in the Mackenzie.

A That's correct.

Q Yes. Don't you think that as they go through the right-of-way and no one has said that they won't cross it, but as they go through the right-of-way that because of the browse there, they may decide to winter in that area in large numbers?

A I don't think that would be the case. That wouldn't be my opinion. I think they may utilize it in passing through, as they do in other areas, but still maintain their existing winter range.

Q Is the same true of smaller animals?

A Oh, small mammals such as microtine rodents, mice and voles, will respond in various ways to the change in habitat.

Q Well, I'm thinking of game animals.

A Well, specifically what?

Q Martins and so on that may be attracted there because of the rodents, as well as the browse.

A We've had a look at that and I think it's described in Volume 7. I'd have to check that. No, I think it's Volume 9, and probably some in Volume 8 of the Biological Report series. We've taken a look via track studies in winter for seismic line areas, mainly to try to ascertain if martin were impeded in the course of their normal movements by cleared rights-of-way in mature forest, and we did find that there was crossing as well as utilization of seismic lines. However, there was no evidence, I don't believe, that martin became permanently attracted to such areas.

Q So I take it in short then that you don't see any concentration of animals on the right-of-way in the three or four or five years after it's begun to grow up again?

A I see concentrations of meadow voles.

Q I'm talking about game animals.

A I do not think -- I can't think of an instance in where I would see a permanent attraction.

Q Yes.

A There will be utilization,

let me distinguish, Mr. Scott, by carnivors for example will utilize seismic lines in the course of their hunting and perhaps you know, in their normal travels within their home range but I do not see a right-of-way becoming a magnet.

Q Well, leaving aside the ease of travel along the right-of-way, do you see any prospect that the right-of-way will become,because of the presence of game, a magnet for hunters or trappers?

A I would assume that in forested areas in the Mackenzie Valley adjacent to communities that it will become a well-used travel route for trappers.

Q Well, that's a travel route because it's easier to walk along a right-of-way than through the woods.

A Or to drive a skidoo.

Q But what I'm asking you is do you see it as an attraction for hunters, apart from travelling down it? Is it going to be a place, in your judgment, that trappers will want to set their traps and where they will want to wait with their guns to shoot animals?

A I think -- well, those are two questions.

Q Yes.

A I think for some species they will set their traps adjacent to the right-of-way, yes, because of the edge afforded and because rights-of-way are used as travel routes, I think I would expect

to see traps set in that vicinity. As far as hunting, it would depend on the season, on the seasonal movements of the species in the Mackenzie Valley. We'd be talking primarily about moose and it's a possibility that there would be some increase in hunting pressure. I don't consider that it would be a very significant factor for the following reason, and that is during the summer period moose are very widely dispersed throughout their range and habitat. They do tend to make the seasonal drift to winter range in the Mackenzie Valley. However, at the time of concentration they are then generally on the islands of the Mackenzie River, so that the focal point of hunting would either be in the river valley or on an opportunity basis elsewhere.

Q Do you see any escalation of game management problems as a result of this edge effect of the right-of-way?

A I can't see anything of a major significance owing directly to the right-of-way. I think the game management problems relate to the harvest and allowable levels of harvest, particularly as they pertain to a winter range.

Q Do you see the escalation of any of those problems connected to the existence of a right-of-way with this kind of forage on it?

A You mean game management problems?

Q Yes. Game management, I presume, is among other things, concerned with a balanced harvest and I wonder if the creation of this right-of-way with the overwintering or the intransit browsing features it may offer, is likely to escalate in any degree the necessity for game management surveillance?

A No, I really don't think so. I don't view that as a very significant issue at all.

MR. SCOTT: Thank you.

WITNESS HEMSTOCK: I might point out, Mr. Scott, that there is already a communication line clearing, there is a winter road clearing, there is the clearing for the proposed highway, and there are numerous seismic lines, so that the effect of the pipeline clearing would simply be one more in many that are already there.

Q Well, now, Mr. Hemstock,

I want to ask you some questions about the present work of the department that you head at Arctic Gas and the department which connects with yours at Northern Engineering Services. Now, we have heard a good deal in previous testimony about certain procedures that are going to be developed to ensure environmental concerns are honoured during the construction process and I don't want to get in to that at the moment. We have also heard from Mr. Hurd and others about contingency plans that will be developed to deal with environmental concerns either during construction or during operations and maintenance. I want to ask you to zero in on an earlier and narrower problem.

Now, you will have received the reports and recommendations of the consultants that you have retained and you are moving toward final design of the project and it has been made clear to us that apart from the general recommendations that the consultants have, they will in addition have recommendations of a site specifc nature to make as the work proceeds, all that is understood by you, isn't it?

A Yes.

Q Now, really what I would like to know is this; have you been working at Arctic Gas or N.E.S. on developing a system so that these recommendations, the site specific recommendations that the consultants will make, and the work of the engineers all will gel together at some particular

period of time?

A Yes.

Q Well, what is the system that you propose in order to achieve this result?

A There are several levels and it will change as the project develops. With regard to the ongoing work of, say, borrow pit examination and some site specific work that is in the early stages now, we have set up a procedure through Northern Engineering, with Mr. Ray Glasrud in charge of it, of, what we call environmental inspection, and then any project that is planned at this stage is to be processed through Mr. Glasrud for an environmental evaluation, and for recommendations with regard to the procedures and timing in the field.

That, we see continuing during the design phase of the project.

We are also working on a -- what I have called an environmental manual which will bring together into one place a series of, I guess, design procedures and criteria stipulations which will apply to specific parts of the project and for example, like, I suppose that the aircraft stipulations which we have in place now and which I think have been filed, are that kind of thing. There would also be specific -- there will be a specific part in the manual which will outline the requirements for fuel storage, where it can be stored, what kind of tanks it can be stored in, how the firewalls should be built and that sort of thing. We see that building

up to be used as a manual just as you would have in engineering, a design manual, for construction.

Q Well, I think, Mr. Hemstock, that manual is the kind of thing that Mr. Hurd told us about. Let me put it this way, as you move toward your preliminary design in your application, what N.E.S. did, was it had two big round table meetings of all the environmental consultants at which the issues were discussed on a mile by mile basis and certain trade offs were achieved, subject to engineering review and so on, and we have heard about that process. We now come to a much more -- I shouldn't say more significant, but an equally significant process which is the tradeoffs associated with the final route selection and the final designs, and for example, you will have Dr. Gunn recommending, A), Mr. Jakimchuk recommending B), those may be inconsistent recommendations, an engineer recommending C) which may be inconsistent with both of them.

Now, what I am getting at is has your department begun to formulate some systematic way of dealing with these tradeoffs? -- At the design stage?

A We still deal with those kind of things on a roundtable type process where we have both engineering and environmental people involved. As a matter of fact, we have just had that kind of a meeting.

Q Well, what troubles me is, it seems to me that you will receive from your

consultants literally hundreds of recommendations, either of a general nature or of a site specific nature. You will have hundreds of recommendations to deal with from your engineering staff on changes that they want. When you get, if you haven't already, into the socio-economic implications of design and route selection, at final design you will have hundreds of recommendations, presumably from that source.

Now, I am no great organizer, but it seems to me that there must be some kind of system that will do two things; that will bring the relevant concerns together at a given moment, with the assurance that they are all there, that some haven't been left out, that you haven't left out Dr. Gunn, because he is out of town that week, and also, in the second place, some mode for deciding the primacy of one condition over another.

A Well, I think there are two levels -- and perhaps more but certainly there are two levels of that kind of interchange between, say engineering and environmental people. I think it's already been described the procedures that are used in the site specific examination of field locations, where the appropriate engineers or geotechnical people together with an environmental person, biologist, visits the site and makes specific recommendations.

Now in that case the biologist would be expected to speak, if you like, for all of the disciplines and where he finds that he needs help, to go to the respective consultants and get that help. It seems to me that that process is satisfactory for such things as wharf locations, compressor station siting, gravel pit selection and so on to get the environmental input into it.

However, there are another level of perhaps more general concerns, and so far we have been handling that on a basis where we will raise the problem and expect input from each one of the consultants and probably discuss that in a meeting with all of the consultants and the engineers in one place.

Q Well, would I be correct then in saying that the mode that you've selected to bring all this to its result is a system of group discussion supported by group inspection for site specific problems?

A Yes, with the rider that in many cases the several disciplines will be represented

by one person who is a generalist.

Q And I take it that the impetus to make that system work will be your staff or the staff at Northern Engineering Services rather than the consultants themselves.

A No, I think that that's properly our responsibility, with help from management staff in N.E.S.

Q Your staff are going to be calling these meetings?

A Yes sir.

Q Again, has your staff in the last few months developed any system for weighting concerns or considerations?

A No sir. Judgment.

Q Do you propose to do that? Have you given thought to that?

A We have certainly given thought to it, and we have simply not been able to find a method of putting these kind of concerns into numbers or any weighting process. It seems to us better to get the experts around a table and get their input and try and come to a decision.

Q Well now, Mr. Hurd gave evidence, Mr. Hemstock, about contingency plans at the operation and maintenance phase, and at page 5516 of the transcript he said, and I'm quoting:

> "The operations and maintenance manual would include contingency plans which would be applied to specific sections of the pipeline

in the event that a break or some repair procedure was necessary within that section. Each of those plans probably would be different from the others, and each would include descriptions or instructions on which equipment would be -- could be taken from which location, how it would travel to that location, and it would take into account sensitivities that might exist in one season but not in another, and so it would deal with it season by season."

And then on page 5238, Mr. Hurd indicated that the contingency plans would among other things include, and I'm quoting --

"...reference data sheets specifying local environmental concerns and related protective measures."

Now, have you or your staff of biological consultants begun working on these manuals, and these environmental references? Has anybody been assigned to start doing that?

A No one has been assigned to start doing it. I have made comments on the C.P.M. type charts which are in a preliminary stage for the design of a contingency plan, and indicated on those charts where the environmental input should be and finally how the environmental impact should be evaluated after the job has been completed. It's a pretty early stage, but the critical path has been plotted for a typical contingency work.

Q But I take it then that

I am correct then, am I, if I thought that that kind of environmental charting for contingency plans has not really begun?

A Only as I indicated. The places where environmental input is required, the details have certainly not begun.

Q Isn't that a very substantial project?

A No, I don't really think it is.

Q You see, the thing that occurs to me is that if Mr. Hurd was right about this, you are going to have to develop for literally hundreds of locations where repair and maintenance may be conceivable, a contingency plan predicated on a variety of seasons, and on a variety of possible environmental inter-actions -- on the Arctic coast you're going to have to deal with at least the four seasons, and the presence of various kinds of birds that may occur in one season or another; the presence of caribou from one season or another; and it strikes me that this is a very substantial exercise indeed. Wouldn't you agree with that?

A No sir. I would look at the preparation of this kind of planning being simplified down to well, perhaps six typical situations and as an example they might be a winter and a summer situation in the tundra, the same thing in the boreal forest, and the same thing in the thawed or

in the sporadic permafrost zone. Those would be the basic basis, and then on those you would simply overlay the specific conditions that would cause you concern. I don't really see that as a particularly difficult proposition.

Q Well, that strikes me--and I may have it wrong -- but that strikes me as a much more simplistic response than the kind of thing Mr. Hurd was talking about. I may have it wrong, as I say. If you take, for example, the Arctic coast as an example, I take it first of all you would have to evaluate the kind of repairs that are truly emergency and the kind that can be postponed.

A Well, that sort of planning of course is implicit when you prepare a master critical path chart for the repair that -- for a repair, and that kind of a chart sets out all of those particular things that have to be done, and the evaluation of the kind of repair and the extent of it, of course, is almost No. 1 in the critical path, and that's a sort of a general planning process which would be available of course, and would be required in every specific case.

Q Yes, and after you've broken down the repairs into the various kinds of repairs, from the point of view of their emergency or non-emergency nature, I take it you then have to evaluate the necessity of postponing the repair or not, depending on the presence of (a) caribou (b) waterfowl

of various species (c) birds (d) frost and so forth.

A That's right, but that is again, implicit in the critical path program that you've outlined.

Q Yes, and I suggest to you that this kind of exercise will have to be carried on with respect not only to six theoretical locations, but with respect to perhaps 100 rivers and other locations of that pipe where there are critical environmental and engineering cross-currents at work.

A Well, again you don't prepare the hundreds of possibilities ahead of time. You simply prepare the approach that you're going to use ahead of time and have that well-documented.

Q All right.

A And then you examine the specific or the site specific requirements when the contingency comes up.

MR. SCOTT:
I wonder, Mr. Marshall, if you could produce the preliminary critical path chart or one of them that Mr. Hemstock has referred to, so that we can see the way in which environmental concerns are incorporated?

MR. MARSHALL: I would like to take a look at it. I don't know what exists, what it is, what stage of preparation it is at. I would like to take a look at it and I will respond on the record.

MR. SCOTT: Yes, I would like to see it even if, as Mr. Hemstock says, it is at a preliminary stage.

Q Well, now, one other thing that I want to ask you about, Mr. Hemstock, because I am concerned to know apart from the business of getting all these consultants together for these and other panels, what work your department is doing now and the question arises in this way . It seems to me that in addition to your critical path and your contingency plans and the environmental implications of them, you will no doubt be giving consideration to the matter of contracts and subcontracts with a view to ensuring that there is contractually a mode by which the contractors and sub-contractors are bound to respond to environmental considerations, do you understand the problem to which I am trying to direct you?

A I think that I understand the problem. The legalities though of framing a contract and so on, I don't regard as our responsibility. We would be preparing, and again the environmental manual would be the basic kind of a document that we would be preparing to indicate the things that we believe have to be done by the various

contractors, and we would leave it to our legal staff to make sure that they are properly incorporated in the contract.

Q Well, is it really quite as straightforward as that? Surely your department will be concerned that the contract should contain certain minimum requirements so that your environmental considerations will be met. In other words, you would agree with me that you don't want a subcontractor fighting an environmentally proper shutdown.

A That is right.

Q So presumably isn't it so that your department would have to begin to give consideration to the various ways in which these environmental concerns can be contractually protected, A) what they are, and B) schemed so that the subcontractors and contractors will be responsive to your environmental monitors?

A Well, certainly we are concerned about that, although it seems to me that that is really more properly a part of the business of forming the contract itself. We will be inputing the requirements that we think are needed and other than reviewing the contracts to make sure that they are incorporated and that we can live with the way that they are incorporated, I think that it would be left to others in the organization.

Q You are not reviewing any contract forms from an environmental point of view?

A I will be doing that, yes.

Q How big is your department at Arctic Gas?

A We have only three people now with a fourth one being added.

Q Yes.

A And we have additional staff that we can call on in Northern Engineering.

Q How big is the additional staff?

A I believe there are five people there now.

Q The thing that concerns me is, if this project goes ahead, there will be at every stage important environmental designs to be implemented of the type that we discussed, and what I am trying to get at is, and I know that you have been busy preparing transcripts of evidence, what have you been doing about these things?

A We have really confined ourselves to planning for it rather than getting involved in the details of it at this stage. We believe that that is something that will have to be picked up, if and when a permit is granted.

Q Well, what specific things have you been planning?

A I think I have outlined several of them. Inputs into the contingency plan, the requirements for, and some of the parts for an

environmental manual --

Q All right. Well, let me turn to one other subject, monitoring. Now, the phrase, "monitoring" has been used through these hearings in a variety of ways and I just want to exclude some of them from our consideration at the moment. Monitoring has been used, first of all, relating to the activities of an inspector who will perform a kind of policing role during construction. I don't want to talk about monitoring in that sense. It also has been used to include performance monitoring or surveillance aimed at detection of the early signs of threats to the pipeline system and the environment, and in that context the Assessment Group, in the responses, Question 55 -- the Assessment Group raised a question about this latter kind of monitoring, and in the responses at Question 55, Arctic Gas dealt with it and I wonder if you could get that out.

There, when the Assessment Group asked you about performance monitoring, the second kind of performance monitoring, you outlined three approaches to performance monitoring. One, patrolling or inspection, looking for anything that might be amiss -- I am summarizing, that seems to be the first kind. The second kind was monitoring of critical areas, keeping an eye on something that you were generally concerned about; and the third was detailed monitoring, a variety of things in a small area, such as the Chick Lake exercise, are you with

me so far?

A Yes.

Q Yes. Now, I am concerned about the second kind of monitoring, that is, monitoring critical areas, keeping an eye on something that you are concerned about, and during the course of the evidence, we, and this is a reflection on us rather than on you, perhaps, but we have had dribs and drabs of that from time to time. The geotechnical panel has told us that they will do slope monitoring of various types to keep an eye on slopes. Mr. Hurd has made some comments on the kinds of monitoring that he will do to keep an eye on critical areas that he is concerned about. We have heard, for example, that there will be monitoring of this type, of this general type done to determine when Mr. Jakimchuk's calving herd is about to come over the mountains.

Now, what we have had, is we've never had really a discussion of the scope of this monitoring, except in terms of specific examples where in response to a question you have said, "well, we will monitor that." You were a member of some other panel. Now, what I want to ask you is, when are you going to be able to make a statement about the scope of your monitoring program, its commencement, how it is going to be manned and precisely what is going to be monitored?

A Well, it seems to me that the scope of the monitoring program will develop, I suppose from now, but certainly during construction.

At this stage and perhaps we could check along the panel, it seems to me that we have determined that the Porcupine caribou herd should be monitored. We've determined that the snow geese should be monitored. I would think that Dr. Gunn will also have a recommendation that we should monitor the rare and endangered species, at least within a few miles of the pipeline.

Q Mr. Hemstock, let me put this to you, you agree with me that it will be too late to develop an overall monitoring program during construction because that will be the first stage at which its implementation is necessary. It has to be done before construction, doesn't it?

A Well, the principle of the monitoring program has to be done before, but it would not surprise me if there were things which arose during construction, which at that time we would determined needed monitoring during construction and following construction, and I think what I am saying is that we are not able to look into the future and determine what those are.

Q Excuse me, what I'm saying is if you're going to develop a monitoring program to watch caribou coming over the mountains to the Arctic coast, to take only one example, that program has to be developed before you go up to the Arctic coast.

A I'd suggest that's already been developed. That's a part of Mr. Jakimchuk's work over the past four or five years.

Q Well, Mr. Jakimchuk has said that that should be done, and there are many other experts who would recommend it, monitoring of that general type; but what I'm getting at is this. When is your department going to be able to present a general statement on what's going to be monitored, when it's going to be monitored, and for what purpose?

A Well, I'd suggest that for the three specific cases that we have already done that.

Q Well, you see, I don't want to deal with the specific cases alone because it seems to me that monitoring is something that any regulatory agency or Inquiry will be concerned about, because monitoring is your representation that we will protect these interests, or at least watch them so that we can then protect them, and the difficulty with this Inquiry -- I'm speaking only personally -- is that every time a concern is raised, I shouldn't say every time but frequently when a concern is raised it is said "Oh well, we will monitor that."

I'm sure that response isn't ad hoc and isn't just designed to meet the question. I'm sure that there must be developing a philosophy of monitoring which will at some time tell us what you're going to monitor, how you're going to monitor, and with what objectives. There has to surely at some stage be developed a policy that will spell out with some fair precision, not precisely what people are going to do it, but the scope of the monitoring program because only with that can we have some kind of assurance. Now it may not be possible to do that today but I wonder if it's possible in the near future to get that kind of statement from Arctic Gas?

A Yes, I think that we could put that together. I think that we in fact have it and it's probably in several places and it's not been rolled into a single program.

Q Well, I would appreciate it if at some convenient time you could attempt to bring the monitoring programs in that second category altogether, not only the ones that we've elicited from you in cross-examination but any other ones that you may be developing on your own so that in one document we can see the philosophy and the objectives of your monitoring, and some general outline of how you intend to implement it. Perhaps you can take that under advisement and deal with it on some other occasion.

A Yes. I think Dr. Gunn has a comment.

WITNESS GUNN: Mr. Commissioner,

Mr. Scott, I would just like to clarify that somewhat. As far as the consultants are concerned. I know in our case since the past summer we have been looking at this matter very seriously and at some length. We have made studies, done predictions, but it's important to follow that up with our monitoring program, and we are in the process of putting together a monitoring program that we consider would cover all the aspects of our particular discipline , prior to construction, during construction, and after construction, and I'm sure that the other consultants are thinking along the same lines.

Now, it will, I anticipate that Mr. Hemstock will draw these together and this will lead to the general outline that you have requested.

Q Well, Mr. Hemstock, I'd like to turn to another subject, wilderness, and I take it that you agree without attempting to define "wilderness" that wilderness values are characteristics that can be recognized in most areas in a way that would achieve some general consensus.

WITNESS HEMSTOCK: Yes.

Q And I think it's obvious from what has been said that to some degree at least the pipeline project will degrade or disturb some of these wilderness values.

A I see very little impact of the pipeline on wilderness because I believe that the corridor through which it is built does not -- is

not a wilderness.

Q Yes. Well in any event you've made clear that your objectives are to minimize impacts, short-term or long-term on wilderness.

A Yes.

Q Now, assuming that you are successful, I would like to divide the pipeline route into a number of portions and get your assessment of the impact on wilderness values of the project. You may say it has no impact on any of them, but I'd like to try them on you anyway to see if there is a difference. First of all, let's talk about the confined part of the Mackenzie Valley such as near Norman Wells or Wrigley where there are several existing transportation systems. What do you say about, if you're successful, the impact of the pipeline on wilderness values there?

A I say there would be little or no impact of the pipeline on wilderness values there.

Q Yes. Let's take next the Mackenzie Valley areas where the only major modification to landscape are seismic lines such as the area between 60 degrees parallel and the highway, the Ebbutt Hills area or part of the area around Travaillant Lake. Is there going to be more impact on wilderness values in those areas?

A There would be somewhat more impact in those areas which are remote from the Mackenzie, if you like to in quotes say "corridor"

where there has already been extensive development. Most of that area, though, has been covered by seismic exploration, so that there is some impact already from development.

Q Well, in that context do you regard the impact of the pipeline on wilderness values as no more than the impact of a seismic line?

A I think that that is very similar to that, with the exception of the compressor stations, which are every 50 miles, and which have certainly a visible and a noise impact on the wilderness.

Q Well, we're leaving out the construction period, I take it.

A Yes.

Q Have you considered the impact on wilderness values of operation and maintenance patrols and the operation and maintence supplying and that sort of thing?

A I would think that that would have a relatively little impact because it would be by air and anybody who is familiar with the Mackenzie Valley knows that there is many, many flights at present. There would be some incremental increase in that.

Q Well, let's take the impact on wilderness values of your project in the Shallow Bay Delta part of the cross-delta route where as I understand it, at the moment there are basically

only drill sites and seismic lines in non-forested areas. Is your impact going to be greater or less there than in previous cases?

A I would think it would be about the same there.

Q Well, what about the interior route?

A I would think that there would be a very marked impact on wilderness areas if the interior route were followed, particularly in Alaska.

Q Well, what about the coastal route in Canada?

A Very little impact because there is already a good deal of impact there.

Q Well, what are you talking about, seismic lines and the Dew Line stations?

A Yes, and there are drilling locations, and I think yesterday we mentioned a mining operation on the Firth River. Those sorts of things to me pretty well rule out the classification of that area as wilderness.

Q Well, comparing the interior route and the coastal route, I take it that it's your conclusion that the impact on wilderness values will be substantially greater on the interior route.

A Yes sir.

Q Does any member of the

panel disagree with that? I take it that silence means "No."

WITNESS JAKIMCHUK: Well, silence can also mean they're thinking, Mr. Scott.

MR. SCOTT: Yes, sorry. I'm not used to that. Well, Mr. Commissioner, I hate to suggest it, but it might be coffee time. Mr. Jakimchuk can perhaps think over a cup of coffee.

THE COMMISSIONER: All right, we'll do that.

(PROCEEDINGS ADJOURNED FOR A FEW MINUTES)

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(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

MR. HOLLINGWORTH: Mr. Scott, before you begin, if I might mention to the Inquiry that having maligned Pacific Western's system this morning I subsequently received the catalogue list of documents relevant to the Berger Inquiry and the Foothills Pipelines library, supplement number one, dated October 15, '75, as well as an addition to that list, and I have distributed it to the participants this morning, sir.

Sorry, Mr. Scott.

MR. SCOTT: Mr. Jakimchuk, have you thought of anything?

WITNESS JAKIMCHUK: I have been thinking, Mr. Scott. You posed a very difficult, extremely difficult question, I feel, and I have been drawn into this because you have asked for our tacit approval or disapproval, and as I recall, your question related to wilderness on the North Slope of the Yukon vis a vis or versus the Interior Route; and it boils down to questions of perception of wilderness and personal experience and aesthetics, and it is extremely difficult to answer.

I suppose the only way I could give you an answer would be to say that I consider there to be wilderness along both routings, and so then I asked myself the question, well, is it pristine wilderness, is it untouched wilderness with respect to Mr. Hemstock's comments; and that is a

consideration, too. There are wildernesses and there are wildernesses. On occasion I felt that --

Q Perhaps I can help you, Mr. Jakimchuk, because I deliberately began without attempting to define wilderness, hoping that we could get from the panel a sort of a grading of various sections of the route in terms of impact on wilderness values; and that grading is obviously going to reflect your own perceptions, but in the course of that process, as you grade them, we will get to know something about your perceptions,because I note, for example, that in dealing with the Mackenzie Valley where there are only seismic lines, for example, I would conclude that Mr. Hemstock feels that the presence of a seismic line has destroyed, -- or not destroyed, but has damaged the wilderness value, and therefore, the imposition of a pipeline,which in some ways is analogous to a seismic line, is not going to impute further wilderness damage.

Now, that is why I ask you, according to ;your own perceptions, is the impact of this project on wilderness values greater on the coastal route or on the interior route?

A Well, let me take the Canadian side. As I say, I have been grappling with this. I am familiar with the routing in both areas and I would have to say that in terms of Mr. Hemstock's comments I feel that there is more pristine wilderness on the interior routing than pristine wilderness on the coastal routing. By pristine, I mean alignment

as it goes through areas where there is or is not evidence of human activity such as seismic lines or oil drums or airstrips or traffic.

So, in answer to your question I say, I see wilderness along both routings or I would, if you dropped me off at the present time in a helicopter anywhere up there I would conclude that it was wilderness very quickly by the way -- I see wilderness in both routings, but I see more pristine wilderness, if I can make that distinction, on the interior routing, untouched, in other words.

Q Dr. Gunn, do you have any comments?

WITNESS GUNN: My views coincide with the last statement by Mr. Jakimchuk.

Q Dr. Banfield?

WITNESS BANFIELD: Yes, I agree with the last statement, certainly recognizing that I don't think the concensus exists that you suggested originally to Mr. Hemstock.

Q Well now, Mr. Hemstock, you referred to a mining operation at the Firth River. I make this observation not to be picky, but because it raises an issue. I am advised that that mining operation is essentially a man and his boy and a bulldozer for six months a year. Is that consistent with your knowledge?

WITNESS HEMSTOCK: I couldn't disagree with that.

Q Yes, and I take it that

WITNESS JAKIMCHUK: Well, excuse me, I could, Mr. Scott --

Q All right.

A It may be a picky point but I feel that I should clarify it, it is more than a man and his boy. I landed at that camp last July, around mid-July, and there were a number of people there including a prospector that had just died the day before, and was buried. It was quite sticky. But there were a number of people there. I think maybe the reason that that was mentioned was the fact that, you know, I was kind of astounded to see in mid-summer, a bulldozer in the middle of a stream bed.

Q Yes. The reason I raise it is, does any member of the panel, in measuring wilderness values regard as detrimental to those values the presence that man associated with certain limited uses?

WITNESS BANFIELD: Yes, you haven't hit the criterion I use , and certainly a bulldozer, which, by the way, did not drop out of the sky, but in fact, got there on its own way, that is definitely to me an indication that the pristine aspects of the wilderness have been changed. To me, I would distinguish between the works of man living in harmony with nature, living off the land in a traditional way, that is certainly still part of pristine wilderness, but the signs of the works of industrialized man, such as roads or bulldozers or

factories, that has certainly taken away from the idea of wilderness.

Q How about skidoos?

A Well, that is a very good point. That must be on the borderline someplace.

Q Well, does any member of the panel accept as wilderness a more extensive definition than Dr. Banfield's?

WITNESS JAKIMCHUK: A more extensive definition?

Q Yes, a definition that accords to man living in the area,more than almost a prehistoric use of the land, that is, the use by natural implements.

WITNESS BANFIELD: I object to prehistoric, and I will start reading something to you, I guess.

Q I think that is fair, Mr. Banfield to object to it. I was reaching for a word to describe man using the land in his natural and traditional and non-20th Century way which I think is --

A I object to that.

Q All right, would you state again for us what you regard as the approriate definition?

A It comes from Man and Biosphere program.

THE COMMISSIONER: It comes from what?

A It comes from Man and Biosphere program.

MR. SCOTT: And what is it?

A What is what?

Q What is the definition.

A I said bear with me for a minute until I reach it --

Q I am sorry, I didn't realize that you were looking for it.

A Man and the Biosphere program is an international program of the United Nations, that is the successor to the I.B.P. program, and they are interested in establishing I.B.P. or biosphere, I'm sorry, biosphere reserves, larger reserves where man is living in harmony with nature as a co-partner with the natural flora and fauna, areas where native people carry out subsistance living, hunting, fishing, trapping in harmony with natural productivity. I don't think this should be considered primitive or a fact not accepted that it occurs in the 20th century. There is a whole area of modern concern dealing with intermediate technology, a whole group of people around the world believe that in fact people can still achieve happiness working in harmony with nature on their own resources in their area. I think perhaps that's enough to clarify.

Q Dr. Banfield, obviously you would conclude that the existence of a forest fire does not remove the land from its wilderness state, no matter how that forest fire is caused.

A I have some difficulty with the latter, "how it was caused". Certainly the exitence of a fire, wildfire is certainly perfectly acceptable and forest fires under some concern. But if say the massive forest fires that swept North-eastern British Columbia in 1942 associated with the construction of the Alaska Highway, or the massive forest firest that swept through Quebec this summer associated with the construction of a road associated

in connection with the James Bay Corporation's activities, I don't find those acceptable.

Q Well, what about seismic lines either in isolation or in numbers, do they destroy the wilderness values, in your judgment?

A They lessen the wilderness value.

Q Now the reason I ask these questions is,Mr. Hemstock, in your paper to the Royal Society in 1970 on page 389 you said, and I'm quoting a portion of it, and it was a question that I'm going to ask you to answer:

"Why can't we set aside areas for parks and wilderness? Why can't we draw boundaries for game preserves? Why can't we dedicate lands for oil exploration and development and for mining?"

That was one of your statements.

On the other hand, in the same year at the International Arctic Wildlife Range Conference in Whitehorse you were the sponsor, I think, of a motion for controlled industrial development within the proposed range. Now, what I'd really like to get is what are your views and if possible, the views of Arctic Gas on the possibility of maintaining wilderness, if it exists, and the techniques by which that should be done?

WITNESS HEMSTOCK: I think that there has been a fair bit of progress since that paper in 1970 towards some of the /suggestions that were made there. There have been park areas set aside. Dr. Banfield

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mentioned the work of the MAB program and it seems to me that that kind of an approach towards the development of the north is quite proper, it's the way we should go, and it can be co-ordinated with industrial development as we go along.

THE COMMISSIONER: What was the name of that program?

A Man in the Biosphere.

Q Oh yes.

A MAB program.

MR. SCOTT: Mr. Hemstock, maybe this was inadvertent, but I didn't want at the moment, if you don't mind, to talk about parks,which I see perhaps in the Southern Ontario fashion, but rather about wilderness areas. Are we on the same wave length?

A Well --

Q I understand a wilderness area as an area that is being preserved for its own integral value, a park as being preserved primarily for some use associated with people, either hunting, fishing, or camping. I'd like you to direct your mind, if you could, to the desirability, if Arctic Gas sees it this way, of preserving wilderness areas in this Territory?

MR. MARSHALL: I think perhaps Mr. Hemstock should deal with your definition which I think maybe is a southern Ontario definition of a park.

MR. SCOTT: Well, all right.

A I find it very difficult

to answer this kind of a question without sort of sitting down and putting a lot of thought into it. I had actually not differentiated very greatly between parks in the Territories and wilderness areas because I felt that many of the park areas are probably very close to being wilderness areas, and would be retained in that state. But I recognize that there is certainly a difference, at least in Southern Canada between the two. I believe that it would be to the benefit of Canada if there were additional park areas and additional wilderness areas that were set aside and preserved in the Territories. I think it's a very complex project -- process though, to do that, because it has to be -- there has to be inputs from so many different sources, from the environmental side, from the development side, from the various government levels and I think we are making good progress but I think we need to continue working along those lines.

Q But would it be correct to say that your posture is that the principle of setting aside wilderness areas or wild parks in the Territories is a good principle?

A Yes.

Q And that what is required is some careful thought about where they should be and so forth?

A That's right.

Q Yes. What do you think about the determination of the State of Alaska to set

aside the Alaska Wildlife Range as a park or wilderness?

A I see I'm going to have to give equal time to Dr. Banfield here. I think that the --

Q It's not the State of Alaska, I was wrong when I said they had set it aside. I think the Congress has.

A That's correct, yes. I think that it has been a good thing that that area has been set aside. I would point out, however, that it does not prevent the construction of canals, roads, pipelines, and so on through that area, and it has been a fairly unique, certainly it is different than a wildlife area. Pardon me, it's different than a wilderness area.

Q Well, we heard from Dr. Weedon from the State of Alaska that the proposal is to turn it into a wilderness area and to impose restrictions that would have that effect.

A I believe that that is a proposal, yes.

Q What I am concerned about is, here is one government taking a step in the general direction, perhaps not in specific terms but in the general direction that you favor, and the project that appears if one route is selected to be inconsistent with that objective.

MR. MARSHALL: Well, I think, Mr. Scott, the evidence has been that there has been a proposal, but it has not been acted upon by the

United States Government.

MR. SCOTT: Yes, I understand that.

MR. MARSHALL: And it's a proposal made many years back.

MR. SCOTT: In terms of preserving wilderness areas, I suppose the earlier the decision is made, the better; but what do you say about that, Mr. Hemstock?

A I'm not aware that the government has taken any action with regard to those suggestions, and all I can give you is a personal opinion. It seems to me that the coastal area has had a fair bit of disturbance in the Wildlife Range with the -- particularly with the Dew Line stations being constructed and maintained along that coast. That that area does not lend itself to the pristine wilderness that the interior part, the mountainous part of the Wildlife Range would.

Q Let me ask you this before we turn to Dr. Banfield, who may want to say something. Assuming that the Arctic coast is -- was originally a wilderness that is different than the interior route, that is a different ecological system, I take it that you would agree that if possible it is desirable to preserve some part of that wilderness for future generations, and that your reservation now is that the wrong part has been selected. Is that where we're at?

A I don't think any part has been selected for a wilderness area.

Q I shouldn't have used selected in any technical tense, but we have an Arctic coast area, I think that we are all aware now that that represents a relatively unusual system of mammals, birds, plants, etc., unlike the interior systems that are found on the interior route, is that agreed so far?

A That is agreed, yes.

Q And consisten t with your general views that wilderness areas should be preserved, I take it that the motive for that is that we should attempt to preserve portions of a variety of ecosystems?

A Yes.

Q And therefore, one of the ecosystems we would want to preserve, if we could, would be an Arctic coast wilderness park of some type, if we could?

A Yes.

Q All right. Now, you seem to have reservations about the selection that the Congress tentatively has made. Do you think that there is another place that an Arctic coast park can be established?

MR. MARSHALL: Mr. Scott, I don't think Congress has tentatively made any selection. I don't think that that is fair. It is not the evidence.

MR. SCOTT: Well,with that reservation --

A I don't have any difficulty at all with the fact that the United States has selected the Arctic National Wildlife Range as just that. I think that the next step which is being considered there, but not by government agencies that I am aware of, of making it all into a wilderness, that gives me some problem because of my definition of wilderness.

Q Well, if the Alaska government and the United States government abandon the Arctic Wildlife Reserve entirely and gave up any of the projects that they may have for it, we would still be faced with the desirability of creating an Arctic shore wilderness or park somewhere or preserving one if we could .

A I think that would be desirable, yes.

Q Where would we have it? What place would you select?

A I don't know that I could select a place right now. I think that there are suggestions, for instance, that portions of the Firth River be selected. There are certainly areas in the Alaska -- in what is now the Wildlife Range, which could be selected.

Q On the ocean?

A Yes, sir.

Q Where are they, just so I'll be clear, are they northwest of Prudhoe Bay?

A No, I said in the

Wildlife Range. I think, within the present Wildlife Range there are areas which could be selected as wilderness areas, probably between the DEW line stations would be the best location.

Q I take it then that you don't regard the Alaska Wildlife Range as the last chance to select an Arctic Ocean wilderness park, do you?

A No

Q Dr. Gunn, do you have anything to say about that?

WITNESS GUNN: Yes, Mr. Scott. Mr. John Livingston who has appeared before this hearing has come forth recently with some interesting suggestions that I think deserve serious consideration. He points out that there are dangers in creating parks for two reasons. One is that parks are for people and if you introduce people you may destroy the very values that you are trying to save. The other is that once you define a park, it by implication leaves the surrounding areas open for development or whatever. His suggestion is that we are going about it the wrong way. That instead of selecting certain areas that should be designated as parks or wilderness areas we should define those areas that may be used for industry or development and create them as industrial parks, and in this way, it leaves the rest of the area as pristine as possible and preserve wilderness in that respect. He feels that this is the way to go about preserving wilderness

areas and I think that this is an interesting suggestion and worthy of consideration.

THE COMMISSIONER: Instead of hiving off the so-called park or wilderness area you hive off industrial development?

A Yes, sir.

MR. SCOTT: Well, I take it that -- I am familiar with Mr. Livingston's theory and have heard it expounded, but isn't one of the difficulties inherent in that, really two difficulties; first of all that there will be as there always is, pressure for the expansion of industrial areas as hydrocarbons and other things are discovered that are useful to man, and secondly, that even defining an industrial area, you would be unable to prevent the intrusions of man, houses, cottages, snow mobiles, all the rest of it, on the balance of the area.

A I think that there are difficulties either way you approach it, but it seems to me that this is a more realistic way of going about it.

Q And then you have to get to the industrial area by a pipeline or a road or what have you?

A Yes, there would be avenues, corridors for travel.

Q Well, now, Dr. Gunn, if you wanted to -- if it was your objective to, unlike Mr. Livingston, to preserve an Arctic Coast

wilderness of some dimension, let us say roughly the dimension of the Alaska proposal, where could it be done on the Arctic Coast in a comparable way?

MR. MARSHALL: There are several things in that. You are suggesting that Mr. Livingston is interested in something different from what Dr. Gunn is interested in and Dr. Gunn hasn't indicated that at all --

MR. SCOTT: No, I am not suggesting that.

THE COMMISSIONER: Well, what was that again? I --?

MR. SCOTT: The question is this: one of the proposals of the applicant amounts to putting a pipeline through the proposed area in Alaska by a sister company. Now, that may or may not destroy wilderness values. I recognize the proposition that it doesn't, but assuming it were necessary to look for a replacement Arctic park, and I am concerned now about the convergence of Arctic Ocean and land, of about the same dimension with the same kind of ecosystem, where would we look?

THE COMMISSIONER: Well, could I just interpolate something here? We heard about this in Whitehorse, and the views of the very distinguished conservationists who spoke there, gave evidence there, were really directed to the notion that there should be an international wilderness area -- leave out this word "park" for the moment -- and that it should encompass what is now the Arctic

National Wildlife Range in Alaska and essentially the whole of the northern Yukon because that area had never been glaciated, because of the presence of the Porcupine caribou herd, the nesting and staging grounds on the coast and the fact that it isn't now subject to any highway, pipeline or other form of entry such as that, putting the Dempster to one side for the moment, that it should be established with a sort of a no tres passing sign for all time. That seemed to be the view that was expressed, and it was based not just on the pipeline proposal, but on the fear that the pipeline proposal -- Dr. Weedon, I think, went into this at some length. The pipeline proposal, if it were acceded to would lead to other development and that you were opening the gate now and they said that you had to close the gate now, before the pipeline went in. I only recite all of that because it is in capsule form what I think the case that all of those gentlement were making, and it constitutes a difference between the Arctic Gas proposal and the Foothills proposal, a difference in terms of impact because presumably if you elected Foothills over Arctic Gas you would still have that option that those gentlemen favoured open to you.

At any rate, what concerns me is that I thought they were sort of taking this thing as an international proposal, all of a piece and that they said that that particular area was unique in the Arctic, in the North American Arctic, so that you can't, as I understand it, have that -- if

it is unique, you certainly can't say, "Well, we won't worry about that, we'll do it somewhere else."

Now, all of that is subject to the question whether you want to -- whether you're going to have to have the gas anyway, and the other question, of course, which Arctic Gas urges, that the pipeline doesn't constitute a form of interference that would denigrate in any substantial way from those wilderness values.

Well, I am sure I am boring you all to death, but I want to make -- I would like you all to address yourselves to what is going on in my mind because at the end of the day I have to comprehend what it is that we are arguing about here.

MR. MARSHALL: I think some of the members of the panel can respond to that question as to -- I think this is what Mr Scott was getting at, is this area unique, or are there other areas that would include the same components as part of the ecosystem?

MR. SCOTT: All members of the panel who are interested in dealing with it have all the questions, and I just put my question in a slightly different form. Supposing the Governments of Canada and United States say, "All right, you can build your pipeline on the prime route,that is up the Arctic coast, but in exchange we propose to set aside a similar,an ecologically similar wilderness over which the pipeline will not run."

Now where would that be? That's really my question, or is such a thing possible?

WITNESS BANFIELD: I want to speak to this subject because as a matter of fact I have some knowledge of it. I was part of the Can adian delegation to the United States in 1957 to discuss the possibility of enlarging the Arctic National Wildlife Range to become an International Arctic, International Wildlife Range. But in the discussion that discuss that's come along there's been so many points raised it's difficult to know where to start.

First of all, as to the legal rightness -- legal existence of the range, it is not by Congress, it was first by executive order of one president before -- immediately before statehood, because

the feeling was that the state would not establish it. I believe it was about 1953. What I do know is that it exists now again by presidential executive order dated 1960.

Another point, where would it be? Well, a U.S. Government has already picked the site for gates to the Arctic National Park, and it is far to the west of the area that you suggest.

THE COMMISSIONER: Excuse me, sorry, I didn't -- what did you say?

A The U.S. Government has already picked an area which they have entitled or labelled, "Gate to the Arctic National Park," and it is far to the west, south of Barrow.

Q Oh yes, all right, on the other side of Prudhoe Bay?

A Right, right. Mr. Commissioner, you mentioned a point on unique, and one hears this question or this adjective mentioned so many times, I think you have to put it into sort of ecological perspective, and the plant and animal community of every mountain, valley, or spring, or the micro-habitat even inside an acorn is unique. Each area is unique, and we build up a high archial arrangement of similarities starting with that absolute uniqueness and the North Slope, that is the one that's been, so much concern has been expressed in, is in fact recognized as one of these groupings and it's, as a vital geographical province and it stretches from the east side of the -- the west side of the Mackenzie Delta

clear around -- clear across the Alaskan North Coast and around the Bering Sea almost to Bristol Bay. Its chief point of interest is that it was largely unglaciated, as you mentioned, during the last Wisconsin glaciation, and connected to Asia by a now submerged land bridge which we call berenzia. Its interest then is that it contains a large proportion of what we call berenzian endemic species of plants and animals and of course any area within this province, such as the Arctic Wildlife Range is more or less typical of the larger group which we call a province.

Now I have an analysis here as to the floristic diversity of this vital geographical province, and if you divide all the species, which on this paper there were 604 species of plants that were occupied the North Slope province, and 18% of them are regular circumpolar Arctic species; 3% were North American Arctic species; 23% were circumpolar sub-Arctic species; 8% are North American sub-Arctic species; and again it's interesting that 35% of all the plants there belong to a berenzia are equally found in extreme Eastern Siberia. Then there's 11% cordilleran radiant and 2% others, and the others are quite often we call panthi-Atlantic species, in other words they stretched all the way from Iceland and Scotland across the Atlantic and reached as far as this slope.

So briefly it's been within that sort of framework that you should discuss the uniqueness of the Arctic Wildlife Reserve, and

where a substitute area might be found if you wanted to maintain some characteristic, you could find it clear around the -- the Americans could find it clear around almost to Bristol Bay. The Canadians can find it no further than the west bank of the Mackenzie Valley.

Now, to go back to the actual management of the Arctic Wildlife Range, the granting of an easement across the range for a natural gas pipeline is mentioned specifically in the National Wildlife Refuge System Administration Act, 1966, which establishes the ground rules for all the wildlife ranges in the United States. This is the interesting point, such an easement can be granted by the Secretary of the Interior provided he finds it compatible with the purposes of the range. So then you have to refer back to the executive order by the president establishing the range. Here you read that the purposes -- there's three of them -- of the Arctic National Wildlife Range, are:

(1) to preserve unique wildlife, wilderness -- sorry, these are the three. Unique wildlife, wilderness and recreational values; and in association with the range management people over the years in Alaska, it's the first purpose that has received priority. In other words, to preserve the wildlife rather than the wilderness and recreational values.

It's recognized that there is a conflict and some mention has been made of this in dealing with national parks. There's an obvious

conflict in trying to preserve wilderness and recreational values. Wilderness is an aesthetic value, and let's talk about a sunset. It doesn't really matter how many people observe a sunset, the aesthetic value of the sunset is not diminished by their observation.

MR. SCOTT: Unless you accept Dr. Parker's view.

THE COMMISSIONER: Well, carry on, that's an aside we can ignore for the time being.

A Thank you. However, the wilderness value is in fact impaired by the density of observers and eventually you get to an area where simply if you accommodate all the recreationalists who have gone there to partake of its wilderness value, the wilderness value has disappeared and this is what John Livingston has spoken about, and also this is mentioned in his paper by Peter H. Pearse in the U.B.C. Law Review which is on everybody's desk, I see at the moment, Volume 6, No. 1, entitled:

"Some economic and social implications of the proposed Arctic International Wildlife Range."

If you develop such an area for full recreational use, you have in fact lost this very femural value of wilderness that was one of the values you tried to preserve.

I think I've spoken enough and tried to, in a very broad way cover the very real and complex problems involved in such -- making such

judgments.

THE COMMISSIONER: Do any of you, Dr. Gunn or Mr. Hemstock, or Mr. Jakimchuk, wish to say anything about this subject, now that we're on it?

WITNESS HEMSTOCK: I have no further comments to what Dr. Banfield has said. I agree with what he has said.

THE COMMISSIONER: All right.

MR. SCOTT: Do members of the panel agree with Dr. Banfield's statement, as I understood it, that which I think comes down to this that, if there is to be a wilderness or a park in Canada that includes this ecosystem, if that's the right expression, then it must be found somewhere between the west shore of the Mackenzie and the Alaska border.

THE COMMISSIONER: I assumed that that was the case.

MR. SCOTT: I understand Dr. Banfield has said it, I just wonder if the panelists agree with that.

WITNESS GUNN: Yes, I agree.

MR. SCOTT: All agreed, then.

Q Well, now, --

WITNESS BANFIELD: I take advantage of your pause there just to mention one fact and that is many people, you know, don't realize that hunting is permitted in the Arctic National Wildlife Range. There is regular hunting of game in that range, in fact it is my understanding there is no closed season on caribou.

THE COMMISSIONER: I think that that was discussed and the situation regarding access is such that they haven't felt obliged to close it off.

MR. SCOTT: Well, now, Mr. Hemstock, I would like to turn now to parks, more in the sense of proposed recreation areas, that is, if we can do it this way, parks as distinguished to a certain extent from wilderness areas, and I take it that it is consistent with your Royal Society paper, to say that the government or the appropriate agency should get busy and start to set aside park or recreational land in the Territory altogether apart from setting aside wilderness areas?

WINTESS HEMSTOCK: Well, I believe that they have already done that to some extent and I believe that the program is a matter of continued study, yes.

Q Well, now the application of Arctic Gas says relatively little about this and as a result the Assessment Group report on page 378 sets out some potential park and recreation sites and states, and I am quoting, "That a review of all such sites and interactions by the applicant would provide a basis for assessing impact and identifying needs for adjustment of pipeline facilities or procedures or remedial measures."

Now, Foothills' panel indicated to us when they gave evidence that they proposed to review those potential parks and recreation sites and I think any others that they developed themselves and would provide that kind of review in a public way to the Inquiry, for the kind of purpose that is stipulated in the Assessment Group report, and I wonder, perhaps not today, if we can ask Arctic Gas to do that as well?

A Yes, we will be doing that.

Q Well, now, I asked Mr. Marshall if he would place on this panel Mr. Moorehead on aesthetics and Dr. Miller who is the archeaology expert and I understand that if for one reason or another it has not been possible to do that so I will direct my questions to Mr. Hemstock. First of all, with respect to aesthetics, a difficult, but nonetheless important subject, I am sure you agree, the application says that specific principles of aesthetic concern will be applied to situations

encountered along the right-of-way, and I think that the prepared evidence says substantially the same thing in those or almost identical words, and then there are I think four or six sketches that are contained in section 14-DN 6.3.9 that really are very rough drawings as I see them that show that you can put a row of trees between a pipeline and a highway and a row of trees between a pipeline and a river and that you can run the pipeline along the side of a hill rather than along the top of the hill.

Now, have I got it right, so far, Mr. Hemstock?

WITNESS HEMSTOCK: Yes, there are general guidelines, if you like, that are illustrated.

Q Yes. Well, now, the Assessment Group noticed that no information has been provided as to how these things are to be implemented, nor, and this is just as important, it seems to me, the degree of importance that the applicant attaches to these aesthetic reviews. Can you tell us how you expect this operation to be applied?

A Well,in a matter of detail we have been advised by Mr. Moorehead of certain things that we should be doing in order to lessen the aesthetic impact of the pipeline and make it as desirable as you possibly can, consistent with what has to be done, and these kinds of things

you have alluded to in your review. Specifically, for instance, we have been advised to try and blend the colour of the compressor stations with the surrounding terrain as opposed to, incidentally, other advised we received which is to paint it in very bright colours and make it stand out, and so that the approach then will be to make it blend as best we can with the surrounding landscape.

Q Could I interrupt you to ask you this, Mr. Hemstock, we've read the application and have seen the little drawings that follow it as examples. What I am concerned about, and maybe you will have to advise us about this later, as Mr. Moorehead isn't here, is what did Mr. Moorehead do, and did he make a report and make any recommendations, and if so, can we see them? I mean, I recognize that the application says that everything is to be done that will be aesthically desirable, but that can be either a statement encompassing 500 items or a statement encompassing very little.

Did he make a report and recommendations to you?

A He made a report and recommendations, but there was in the report really very little more than what you see in the application. These drawings were there together with the description of the zones that he divided the pipeline into which are on page 9, section 7.5, together with the general comments, as I have indicated.

Q Well, so I can take it then that the application is in substance all you have from Mr. Moorehead to this stage?

A Yes, I will have to check that but I think that essentially all of it is here.

Q Is he going to be involved in final design?

A Not necessarily he, but there would be a landscape architect involved.

Q From his office? -- Or some other consultant?

A It would likely be from his office, although we have not yet made that decision.

Q And I take it that apart from what you incorporated in the application, you at the moment have no more precise idea of what he is going to be doing there than is set out there?

A I would see his site specific work being mainly associated with the compressor stations which are the permanent features of the pipeline, and I believe that in your first question there was another part, and that is what importance does the applicant assign to aesthetics and I don't think that I answered that. I believe that it really applies basically to the above ground structures which are required for the pipeline. As I have indicated, the aesthetic impact of the right-of-way clearing is simply one other in what are four or five

right-of-ways along the corridor now, and we don't really see that there is very much that can be done about that other than the things which have been outlined here.

Q Well, Mr. Hemstock, you see three of the four diagrams are really routing and location suggestions. The place in the terrain where you should place your pipe for aesthetic reasons. Now, is that -- that seems inconsistent with the view that you have expressed, that aesthetics is going to be primarily a compressor station business.

Is Mr. Moorehead going to have a role in this kind of location and routing exercise as you move to final design?

A I would disagree with that interpretation. We asked him about what he, how he would evaluate the aesthetic impact of the pipeline routing as selected. And with rare exceptions, I would not expect that he would have a part in the pipeline route selection.

Q Well, for example, he suggests a routing of the pipe in his diagram, on a certain part of a slope of a hill as opposed to another part of a hill.

A Which one for example?

Q It is the last diagram of the four or five that he has produced.

Now that obviously speaks to the location of the pipe in the terrain and what I am concerned about is that that will obviously involve trade-offs with other people and is Mr. Moorehead going to have any real role in this or is it, as you say, really a compressor station business?

A Are you referring to section 7? Diagram "G"? Or zone "G"?

Q It is the last page headed "Visual Aspects of Alignment" in section 14, 6.39. The pages are not numbered but I can show it to you if you like.

A No, I have it now. I was looking in section 7. And I was referring in my comments to the drawings which are given in section 7.

Q Well, the drawing I

referred you to suggests that Mr. Moorehead has views about the alignment of the pipe at, if you take his drawings literally, at least at one kind of location. Is he going to have the input into that exercise?

A No, as I have indicated that we do not believe that we can do much about the alignment of the pipe with regard to aesthetics. We do not feel it is very important because there are already several clearings in the general area.

Q Well now, the Assessment Group also suggested at page 339 that and I am quoting,

> "Considerable benefit could result if the Applicant were to obtain the views of local people and other interested groups on the implementation of aesthetic principles and their application in specific geographical areas during the planning and construction phases of the project."

Now have you in mind the adoption of any practical procedures to achieve this result?

A We would be discussing with the local people the immediate location of the pipeline in their area, but not the, I suppose in a very general way, the aesthetics but I think more importantly the impact on the pipeline with regard to terrain and proximity to the villages.

Q Well, do I understand from that that before you complete final design you will have meetings with the people in the appropriate communities to determine what input they may have with respect

to aesthetic location or other like matters that are relevant at final design?

A Yes.

Q In what time frame do you contemplate that these meetings will commence? After certification or before?

A After certification.

Q Well now, only one other area and that is archaeology. The archaeological volume that relates to the Northwest Territories is prepared by Dr. Miller and as you are perhaps aware the Assessment Group in its report on archaeology expressed some concerns over Dr. Miller's approach to the problem and at page 382 of the Assessment Group Report, it was said and I am quoting --

> "The most important concern is that the Applicant's proposals and that is the proposals contained in Dr. Miller's report, for an archaeological salvage program are based upon a concept of priority classification which the Assessment Group regards as suitable only for the most preliminary stages of the operation."

Now, this is leading up to my question. Since then Arctic Gas has had a report prepared by, among others, Dr. Reeves who gave evidence for Foothills that deals with archaeological salvage programs and like matters in Alberta, British Columbia and Saskatchewan. And I am advised by Dr. Mooreland that in terms of a rating procedure to rate archaeological sites, it sets out a

different procedure. Dr. Mooreland tells me the difference is a subtle but important one. It sets a different procedure than Dr. Miller's and the first question is would Arctic Gas be prepared to re-evaluate the routes north of sixty according to the criteria that are utilized in the provinces under Dr. Reeves' Report rather than the criteria that are set out in the Miller Report?

A Yes, and perhaps I should just review the process that we have gone through in the archaeological assessment. We had asked Dr. Miller to prepare the overall assessment for the whole line from Prudhoe Bay to the 49th and as you know, he did that and those reports are available for Alberta, Saskatchewan, the Territories and for Alaska. And he did it on the basis of a priority classification where he identified areas where he thought there would be high, medium or low possibilities of archaeological resources.

What we did not make clear in our report, or in our application, was that that was simply the first step and that we would follow that up, as Dr. Reeves has suggested and I believe Dr. Miller suggested this too, by reconnaissance surveys which would provide us with the, with much more detail about the, if you like, every mile of the pipeline, and we have already started that work in Alberta under Dr. Reeves. He has completed a reconnaissance, on the ground reconnaissance of the pipeline, proposed pipeline routing from the B.C.-Alberta boundary to Caroline.

And in the Northern Yukon, we have had Jack Cinq-mars who, I believe had a part in writing the Government Assessment Report. Work on the alignment in Northern Yukon in a reconnaissance phase.

We have not received those reports yet but they are due within the next few weeks.

Q Yes, well, whether there is a misunderstanding or not, do I understand now that the criteria that will be applied is the criteria that is found in the Reeves Report?

A That is right, yes.

Q Well now, just one or two other matters on this subject. The Reeves Report also sets forth a different proposal with respect to the possibility of avoidance and recovery of the sites from Dr. Miller's and I wonder if I understand that the position is now that Arctic Gas will apply the Reeves formula in those areas rather than Dr. Miller's? I am not saying anything against Dr. Miller, it may be just a misunderstanding.

A Could you read the Reeves proposal?

Q Yes. The Reeves proposal first of all, the Miller proposal contemplated that all endangered sites, after they were identified, should immediately be excavated. The Reeves proposal contemplates that there may be room for avoidance of the site and there may be -- and it may be desirable to postpone excavation and responding to the fear that immediate excavation may lead some archeologist to do a hurried and unsatisfactory job, and the Assessment Group prefers the Reeves approach, and I wonder if Arctic Gas is prepared to adopt that in the Northwest Territories?

A Yes, that is the one that we are adopting, is the avoidance, if possible and the recovery of only those which are going to be unavoidably impacted.

Q And do I understand also -- I'll only be five minutes, Mr. Commissioner -- do I understand that the archeological sites will be evaluated by a professionally qualified archeologist in every case?

A Yes sir.

Q How do you propose that the archeologist's views shall be rendered consistent with the views of other disciplines? For example, when it comes to avoidance and matters of that type, is a conference going to be held or what clout is the archeologist going to have?

A Well, I think his clout will obviously be dependent upon the importance that he puts on a particular site. My concept, though, of the avoidance of an archeological reserve would be that in most cases the realignment would be a very slight realignment, and I would not expect there to be any conflict with other environmental or engineering concerns. I would think that that would be the case in almost every instance.

Q Yes. Well, what happens if you have to re-design something or change your plan, apart from routing?

A I really don't know what you'd have to re-design. It seems to me that if there is an archeological site that is on the specific alignment of the pipeline, it's simply a matter of moving it over a few feet or a few yards to avoid that site, to put it off the right-of-way, and that that would be a decision that could be taken on the job. If, in the rare case it had not -- that site had not been picked up during reconnaissance. We would expect, however, that most of these sites would be picked up during the on-the-ground reconnaissance of the pipeline right-of-way, and that would give us ample time to make the decision either to recover, if we couldn't avoid it, or to avoid it by realignment.

Q All right, well now under the Miller scheme when you came upon a site, his proposal essentially was to excavate it right away, and that burden would be the responsibility of Arctic Gas. Now

under the Reeves plan, because of the possibility of avoidance and the possibility of postponing excavation which is essential to his plan, I take it that Arctic Gas will be responsible for those excavations when they occur later.

A If we have avoided the site with the pipeline right-of-way, I see no reason that we should be responsible for the excavation of the site.

Q Well, what about if the site lies within your right-of-way but not adjacent to the pipe?

MR. MARSHALL: That gets to a legal question, Mr. Scott. All the right-of-way gives you is the right to enter in to lay a pipeline. It doesn't, it seems to me, unless the department chooses to include this in its grant of an easement, give you any right to do anything else.

MR. SCOTT: Well, let me put this proposition and it may be that Arctic Gas wants to think about it. The advantage of the Miller scheme was that all sites got excavated by Arctic Gas while the work was being done. The archeologist said, or some of them, "We don't like that because that leads to hurried and often premature excavation. "

Therefore the Reeves scheme was devised so that excavation could be postponed. I take it that you're not using that scheme to avoid doing excavations that you would do under the Miller scheme.

MR. MARSHALL: Well, that really

gets to argument, eh? You may want to argue that Arctic Gas could forever after be responsible for carrying out excavations that -- of sites that may have been noticed during reconnaissance trips by its archeologists or employees. You can urge that on the Inquiry if you wish.

A My recommendation will be that Arctic Gas not do any excavation off the right-of-way.

MR. SCOTT: Yes.

Q Well, what about excavations on the right-of-way? That are postponed beyond construction.

A Most of them, again I would not recommend that we touch them unless there was some reason to believe that there would be some cause for disturbance during the operation of the pipeline. In most cases there will be virtually no need to go back on the right-of-way and cause any disturbance.

Q Well, I take it that you would not prevent archeologists from entering upon the right-of-way to do excavations, as long as you don't have to pay for them.

MR. MARSHALL: That's a question of the terms and conditions of the grant of the easement. The government is entitled to reserve that right. The experience in the south, of course, is that farmers who grant right-of-ways to pipelines across their land reserve the right to farm over it.

MR. SCOTT: I don't want to

recommend a condition that is absolutely impossible for Arctic Gas. What I'm asking is, is there anything wrong with that? Would you permit archeologists and if you had your way under what terms to enter the right-of-way, to excavate finds that have been either avoided or postponed for excavation?

A I see no difficulty as long as the preliminary excavations which in some cases are made with mechanical devices, are very carefully supervised and they don't dig up the pipe.

Q That is why I would like you to do it.

Well now, I take it that there will also be a virtue to excavating sites that it is desirable to excavate on the right-of-way before the frost bulb has begun to establish, and you recognize that interest?

A That would apply to a small portion of the right-of-way, yes.

Q Now, I take it also from discussions earlier that Arctic Gas is prepared to assure that one or more archaeologists as required will have an opportunity to carry out continuous ditch wall examination as you proceed?

A Yes.

Q Is a single archaeologist in your judgment enough or do you have any advice on this?

A I think that it would be more than enough, because the progress of the ditching machine will be very slow and it probably would take only a few hours to do the total ditching of the day, or perhaps even several days, but the difficulty is that the progress of construction has to go ahead and the archeaologist has to look at the ditch wall during the relatively short time that it is open, so I think that there has to be an archaeologist on each spread.

Q Yes, now, two other differences between the Reeves and Miller report. In the

Reeves report the Cinq-mars proposal for the Northwest Territories is adopted for the provinces. It was not adopted, per se, in the Miller report.

Now, I know that Dr. Cinq-mars is working for you. Do we have your assurance that the Cinq-mars proposal that was adopted for the provinces will also be adopted for the territories? That is his proposal that relates generally, I think to salvage processes.

A I can't recall the difference between the two.

Q Well, it's another difference that Dr. Morland tells us is signifcant, but subtle. Dr. Cinq-mars' proposals for salvage operations and sequences was adopted by Reeves for the provinces. It was prepared for the Northwest Territories by the Archaeological Survey of Canada, by Dr. Cinq-mars. It was adopted by Reeves for the provinces. It was not adopted by Miller for the Northwest Territories. Will Arctic Gas adopt it for the Northwest Territories?

A At the moment I see no difficulty with it, but I would want to review Dr. Jacques Cinq-mars report and his assessment of how well the scheme has worked so far in the northern Yukon with his work for us this past summer. I should also clarify that we are going to be subject to the Provincial Archeologist's rulings in the provinces, and what we have suggested there has still not been approved or disapproved by those

officers, so that is still ahead of us.

Q And the same will happen, of course in the Territories subject to regulation --

A That is true.

Q Now, one general question to drive the issue even further home, if I can. There are a range of other differences between the two reports, the Reeves report to the provinces and the Miller report to the Territories. I wonder if in due course when you have time you could let us know whether there are any Reeves recommendations that will not be adopted in the Northwest Territories?

A Yes, we could do that.

Q Thank you. Well, now, neither of the proposals, either Reeves or Miller, contain any plan for the organization of this archaeological project and it may be a substantial one. Is Arctic Gas in a position to present any such outline at the present time?

A With regard to manpower or responsibility?

Q Well, perhaps what you can do -- you may not be as -- lack the comprehension of the questions that I do, but perhaps you could in due time prepare a statement which will set out the organization of the project, for example,who will direct it if it is possible to know that, what the relationship will be between the project and CAGSL

personnel, how many archaeologists will be needed, an assessment of whether they will be available bearing in mind that there is a shortage of archaeologists in Canada, whether the project will be divided into sections, or particular areas, and how these areas will relate to the construction spreads, and your assessment of the timing of the work with relation to the construction spreads.

All of those matters have raised some concerns, and particularly the last one, the ability to set up a project that will work effectively with the construction schedule.

THE COMMISSIONER: That seems to me to be a reasonable request, Mr. Hemstock, if only because you are going to have to do it anyway for your purposes, as the day when construction is to begin comes closer, if you could do your best to prepare something along those lines. This is a large archaeological project and these comparisons to the building of the CPR are often spurious, but if they had had an archaeological plan, -- maybe they did have one -- I don't know -- but it is the kind of thing that we are asking you to do.

A We won't have any great difficulty doing that. We have already -- you know, I think I could answer many of those questions right now --

THE COMMISSIONER: Well, you, You said that you would have one archaeologist on each spread, that is nine, and so

forth, that I think that perhaps it would be more helpful if we simply took the record and set down the responses to the specific questions. I think that would be a more orderly way to do it.

MR. SCOTT: And on the last issue, you will understand that the matter that we are concerned about is the time frame in which the archaeological work will be done with reference to clearing, ditching, backfiling and so on?

A Yes, and again, we have at least established in our own minds how that would be done, but I want to review it again with both Dr. Reeves and Jacques Cinq-mars to see the results of their summer work, and see if they have changed their mind at all.

Q And just two other things to put on your list. Don't forget borrow pits and other items of that type that are not strictly speaking on the right-of-way.

A No, the areas off the right-of-way that are required are also part of the project.

Q And I take it that you can perhaps induce your advisors to say something of whether they contemplate a role for, and if so what the role will be, in this exercise of the Archeological Survey of Canada, the National Museum of Man, and the National Museum of Canada.

A I think that Dr. Banfield has had many years of experience in that area. Perhaps that's something we can get him to do.

Q All right.

THE COMMISSIONER: Well, I think that your plan is something that it might be useful to put together on one piece of paper or at least on a series of pieces of paper clipped together, and we can send them along to the National Museum and these other organizations and we'll let you have the last word before lunch, Dr. Banfield.

WITNESS BANFIELD: Thank you. I have only to comment that when I first identified the problem I directed the senior executives to Dr. William Taylor, the Director of the Museum of Man, to discuss the whole problem.

WITNESS HEMSTOCK: I should perhaps say that I have also reviewed this with people

in the Museum of Man.

MR. SCOTT: Well, subject to those undertakings, those are all the questions I have and I want to thank each of you very much.

THE COMMISSIONER: Any re-examination?

MR. MARSHALL : I'd like to defer on that until after lunch.

THE COMMISSIONER: Well, we'll start again, let's say, at 2:15, and if there's any re-examination you can proceed, Mr. Marshall, and I understand your panel is ready, Mr. Hollingworth. O.K., we'll look forward to the Foothills panel then.

(WITNESSES ASIDE)

(PROCEEDINGS ADJOURNED TO 2:15 P.M.)

(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

THE COMMISSIONER: Well, we will come to order, ladies and gentlemen.

MR. MARSHALL: Mr. Commissioner, I have no re-examination of the Arctic Gas panel.

THE COMMISSIONER: Well, the panel is gone except for Mr. Hemstock, but I know Mr. Hemstock will convey my thanks to all members of the panel who bore with us for the last two weeks, so patiently, and so very much to our edification. So we'll move on now.

MR. HOLLINGWORTH: Thank you, sir. The Phase 3 panel relating to the living environment of Foothills Pipe Lines is before you, and I might introduce them;starting from my left is Mr. Norbert G. Kondla, Mr. Worth Hayden, Mr. Bouckhout, who has been here before, Dr. George Finney, and Dr. Paul Whitney.

LEO W. BOUCKHOUT, resumed:
WORTH HAYDEN,
GEORGE FINNEY
PAUL W. WHITNEY
NORBERT G. KONDLA, sworn:

DIRECT EXAMINATION BY MR. HOLLINGWORTH:

Q The prepared evidence is before you, sir, and I'll start with Mr. Bouckhout. Mr. Bouckhout, you are manager of Foothills Environmental Affairs Department?

A Yes.

Q And you have previously appeared before this Inquiry as a member of Foothills

location and physical environment panels?

A Yes.

Q Would you please describe how biological concerns were initially accounted for in Foothills' project?

A In late 1974, Foothills Pipe Lines Ltd. retained the Lombard North Group Ltd. an environmental consultant, to investigate biological concerns relative to the Foothills' project and to represent those concerns via recommendations for mitigation of potential impacts. The result of Lombard's initial input was the production of our environmental statement and the environmental map series which form Part 5, Sections D and E of the Foothills' submission documents to the National Energy Board and to the Department of Indian Affairs & Northern Development.

In preparing the environmental statement and environmental map series, Lombard's biologists responsible for the subject fields of vegetation, aquatic systems, birds and mammals made use of existing information on the study area. This information was obtained from various government documents; from consultants' reports prepared for the delta producers, and for the Department of Public Works' Mackenzie Highway project; from work done by the Environment Protection Board; from reports produced by Canadian Arctic Gas Pipeline Limited consultants, while one of our sponsors, the Alberta Gas Trunk Line Company Limited was still a member of that consortium; and from personal communication with individuals familiar with particular

aspects of the study area. These information sources were listed in the appropriate bibliographies contained in the environmental statement and in the map series.

I believe that the most significant result of Lombard's initial involvement was the elaboration of environmental concerns and identification of appropriate protection measures which are presented in sub-section (5) of the environmental statement. The protection measures designated therein were neither then, nor should they be now, considered complete or unalterable. They were intended to represent a base which would be subject to refinement as more information, particularly site-specific detail, became available and as Foothills proceeded toward the final design phase.

The elaboration of environmental concerns and identification of protection measures as they appear in the environmental statement were completed before Lombard had undertaken specific field studies relative to the Foothills' project. This work was, however, done by individuals familiar with northern ecosystems, and particularly with segments of the Mackenzie Valley. As I have already stated, Lombard's biologists relied upon an information base which was available at that time, and on their personal judgment.

Q At the stage you have described, what effect did biological concerns have on route and facilities locations?

A When Foothills began

project planning for a Mackenzie Valley gas pipeline, in late 1974, the route from Richards Island to the Alberta border that had been identified by Canadian Arctic Gas Pipeline Limited was generally adopted as a starting point. As Mr. Mirosh has previously indicated in his direct evidence on our location panel, Foothills made some immediate adjustments to the route in the area of Travaillant Lake north to the East Channel of the Mackenzie River and in the area south of the Willowlake River.

Since biologists had provided an input into CAGPL's route location from Travaillant Lake south to the Willowlake River where Foothills' route was coincident, and since Lombard's biologists had not at that time had the benefit of a personal field evaluation of the line and facilities locations, few definite recommendations for locational changes were made. There are, however, four areas where environmental input did affect line and facility locations.

As previously indicated by our location panel, a decision was made to route some distance from the shore of Travaillant Lake, in the area of Milepost 130 to 160, as a permanent trapper's cabin was located at the north end of the lake and traplines extended along the shore area and westward to Sandy Lake. Also the area south and south-east of the lake was designated as a local trapping and hunting area on the Arctic land use map series.

At a joint engineering/ environmental review of route and facilities' location held in February of 1975, Lombard's mammalogist expressed concern over the locations of wharf and stockpile sites at the Thunder River and Payne Creek mouths at approximate respective Mile Posts 172 and 230. He indicated that information suggested the presence of denning areas at these locations. As a result, the Thunder River site was moved about 14 miles upstream on the Mackenzie River and the Payne Creek site was moved from one mile south of the creek outlet to about three quarters of a mile north, downstream on the Mackenzie.

The fourth area where an expressed concern resulted in an environmentally based route location is in the area of the Ebbutt Hills near Mile Post 635 where Foothills decided against crossing a proposed I.B.P. site.

Q In what ways could the pipeline project have an impact on the biological component of the environment, and how can potential impacts be mitigated?

A The project could have a detrimental impact on biological systems through direct disturbance by project activities and facilities, through indirect disturbance resulting from increased access by man to otherwise isolated areas, and through altera tion of the physical base, that is the land, water, and air. In my opinion, the overall most serious cause for concern, particularly in the

long-term, is the potential for alteration of the physical base. In some instances, however, potential for direct and indirect disturbance constitute equal cause for concern.

Potential impacts can be mitigated in the ways I have already outlined in my direct evidence for Foothills' physical environment panel. These include environmental consideration in the areas of route and facilities' location, physical design, activity procedures, activity timing, contingency planning, and restoration methods. Among the preceding, the primary way to mitigate impact is to spatially avoid potential problem areas. SHould this not be practical from an economic or engineering viewpoint, or if no environmentally preferable alternate is available, our recourse is to apply mitigation measures in one or more of the remaining five categories.

An example may illustrate my point more clearly. Consider a hypothetical case where the pipeline and a compressor station are to be located in a very significant waterfowl staging area. A locational change to avoid the area would result in a line length increase of two miles and would place the line in terrain which is less suitable for construction. If no other means of mitigating the potential impact were available, line and compressor station relocation would be our only option.

In this case, however, several

other options may be available. If it is anticipated that compressor station noise would prohibit waterfowl from using this crucial area, special silencing euqipment could be incorporated into the compressor station design. SHould aircraft flights during the staging period pose a threat to the waterfowl, aircraft flight procedures for logistics support could be controlled through minimum flight altitudes and use of designated least disturbing flight paths. If these measures are not deemed sufficient, the timing of activity, including aircraft flights could be controlled to minimize potential direct disturbance during the staging period. Contingency plans would be developed to cope with possible impact on the staging area through such eventualities as a fire or major spill of toxic substances. Finally, restoration measures including revegetation and slope stabilization would be applied to ensure that potential long-term impacts on the local habitats are minimized.

We could now extend our hypothetical situation even farther. If the design, procedural, and timing measures could not be applied or were ineffective, waterfowl which would normally use the staging area may be forced to use peripheral areas, possibly resulting in some loss to the populations. If, however, the measures of contingency planning and restoration were successful and the habitat were not seriously impaired, it is conceivable that the impact would be short-termed and that waterfowl would accommodate to the presence

of the pipeline right-of-way and compressor station and use the staging area again after construction had been completed.

Q Taking into account the ways in which potential impacts on biological systems can be minimized, would you now explain how Foothills, with the aid of its consultants, has proceeded beyond the initial stage of preparation of the Environmental Statement?

A One of the major initial considerations in developing any pipeline project is the establishment of line and facilities' locations. Once preparation of the Environmental Statement was completed, our primary objective was to review the line and facilities' locations in the field and to recommend relocation where deemed necessary.

Lombard's biologists undertook field studies during the summer and fall of this year to review the main line, laterals, and facilities' locations. I have already discussed the interrelationship of physical and biological studies in my testimony for the location panel. The other members of this panel who are representing the subject areas of fish, birds, and mammals will present brief accounts of the field work conducted in their respective disciplines.

As a result of their studies our biological consultants have made several recommendations for route and facilities relocations. These recommendations, including their status, are listed

in Table I of my testimony. No formal relocation recommendations made by our biological consultants have been rejected to date.

Beyond location assessment field studies have enabled the biologists to become more familiar with the project area and with potential biological concerns. This will permit the biologists to prepare further mitigation recommendations or protection measures relative to project design, procedures, timing, contingency planning and restoration.

As reports of the recently completed and current field investigations are prepared, recommendations for impact mitigation will be incorporated. This stage comprises an initial refinement of the protection measures outlined in the Environmental Statement. As the project progresses to the final design stage, refined protection measures will be applied to the project area and activities on a site-specific mile by mile basis. The result will be the preparation of an environmental manual for use by our environmental inspection staff. This manual will include not only designated protection measures but also optional measures and procedures for application to unanticipated events.

Q What biological work do you anticipate in the future?

A We are presently conducting aerial and ground surveys on the distribution and movements of ungulates, particularly caribou, relative to our line location in the Travaillant Lake mainline area and along the Yellowknife-Pine Point lateral system. Additional winter mammal surveys are planned for early 1976. Also, a winter stream survey program is planned for February or March of 1976. In our future field work emphasis is being placed on the lateral systems, although additional field studies will be carried out along the mainline.

Collection of information along the Yellowknife-Pine Point lateral system is of particular importance as the present data base in that area is relatively small. Construction of the small diameter laterals would, however, follow mainline construction by at least one year and therefore sufficient time will be available to overcome information deficiencies thereby permitting adequate environmental input.

Q Do you believe that the implementation of detailed protective measures prior to and during construction will adequately mitigate overall potential environmental impact?

A No. I believe it is unreasonable to assume that either applicant can fully predict the entire spectrum of significant inter-actions which will occur between the project and the environment

The project design considerations, construction plan, and environmental concerns are of such scope that problems with potentially significant environmental repercussions will arise despite our efforts to avoid them.

I view the ability to recognize problem situations and to react rapidly to such situations as a major component in environmental protection. Thus the elements of inspection, surveillance, monitoring, contingency planning and restoration and their success will have a considerable bearing on the ultimate impact of the project on the environment.

Q Mr. Kondla, you're a botonist with the Lombard North Group Ltd., a consultant to Foothills Pipe Lines?

WITNESS KONDLA: A Yes sir.

Q And does the sheet attached to the prepared evidence and having your name at the top accurately describe your academic qualifications and experience?

A Yes, it does.

Q Would you please read the contents of the sheet?

A I have a Bachelor of Science degree, with a botany major and zoology minor from the University of Calgary in 1973. During the summers of 1971 and 1972 I conducted biological surveys with the Alberta Department of Lands & Forests. Since 1973 I have been a biologist of the Lombard North Group;experience with the Lombard North Group

pertinent to the use of vegetative information in environmental studies include the involvement in a biophysical classification of Riding Mountain National Park in environmen tal studies for four Alberta tar sands and oil sands projects, the Mackenzie Highway, and two urban development studies and two Provincial Parks.

Q Do the differences between the CAGPL and Foothills' routings have any implications with regard to potential impact on vegetation?

A The Foothills' route is largely restricted to boreal forest and forest tundra vegetation types while the CAGPL prime route would pass through a significant amount of various tundra vegetation types. The CAGPL project would have land requirements in various riparian vegetation types of the Mackenzie River Delta; a requirement that Foothills would not have. Thus the Foothills' project would on an areal basis affect considerably less tundra and riparian vegetation types than the CAGPL project.

Considering the differences in ease of revegetation, potential impact and prevalance of permafrost in the forested versus tundra vegetation types, I feel that the Foothills' project would have less overall impact on vegetation.

Q Are there any other aspects of the two projects which may result in differences in impact on vegetation?

A Yes. There are differences in the revegetation proposals. Since revegetation

is an integral part of each project, it must be examined in terms of the impact on and re-establishment of natural vegetation. Revegetation procedures contribute to less overall impact on natural vegetation to the extent that they reduce the probability of change in natural vegetation and promote a more rapid return of native species to disturbed areas.

The revegetation proposals by Foothills offer a number of advantages as compared to the proposals of CAGPL. The greater use of native plant species will provide for a more rapid establishment of native plants. The predominant use of native species should enhance the likelihood of uniform revegetation success and produce a corresponding reduction in vegetation failures requiring supplementary attention. Because they are species that can produce adequate growth with less fertilizer than agronomic species, there will likely be less fertilizer used on the Foothills' project. Native plant species, in conjunction with minimal fertilizer application, will prevent the rapid accumulation of excessive amounts of litter that could constitute a fire hazard. In addition, the lower the fertilizer application rate, the greater is the reduction in potential artificial enrichment of undisturbed areas.

Q Mr. Hayden, you're an aquatic biologist with the Lombard North Group Ltd., consultant to Foothills Pipe Lines?

WITNESS HAYDEN: Yes.

Q And does the sheet

attached to the prepared evidence and having your name at the top accurately describe your academic qualifications and experience?

A Yes.

Q Would you read the contents of the sheet, please?

A I received a B.Sc. in biology from Utah State University in 1968, and an M. Sc. in freshwater ecology from the University of Alberta in 1971.

Between 1968 and 1971 I did my thesis research on the ecological and behavioural aspects of benthic invertebrates in a brown-water stream in West-Central Alberta.

Between 1971 and 1973 as an extension biologist, I organized and interpreted programs relating to trout farming for the Manitoba Department of Mines, Resources & Environmental Management. I also supervised several Federal/Provincial Fisheries projects.

From 1973 to May of 1975 I was a fisheries management biologist for the Manitoba Department of Mines, Resources & Environmental Management, Eastern Region. Here I directed biological and management aspects of commercial fisheries on Lakes Winnipeg and Manitoba and Cedar Lake. I also supervised sport fishery biological investigations and management in Eastern Manitoba.

From May 1975 until the present I have been a senior biologist with Lombard

North Group working primarily on the aquatic assessment program for Foothills Pipe Lines Ltd.

Q Would you explain how Foothills proposed alignment differs from that of CAGPL relative to potential impact on aquatic systems?

A In those areas where the Foothills and CAGPL alignments are similar, our conclusions on potential impact are much the same. However, there are major potential impact differences in areas where proposed alignments cross different watersheds. The most obvous case is that Foothills does not intend to connect Alaskan gas fields with the proposed Mackenzie Valley gas line. This results in the avoidance of a number of Arctic char spawning and overwintering streams, and rivers with actively migrating channels. Our field program and other fisheries surveys in the Mackenzie Valley have not detected Arctic char in any of the streams that would be crossed by Foothills' proposed line. Arctic char are in limited abundance and distribution, and are of high economic value. Since they are a fall spawning fish, their eggs are more susceptible to the adverse effects of siltation than the eggs of spring spawning fish such as the grayling.

The Mackenzie Delta is a particularly important area for aquatic life since it is a known spawning, migration and overwintering area for many fish species, and is also an important area of primary aquatic production. Deterioration of water quality in this area could have far reaching adverse effects. Thus, construction of a cross delta line as proposed by CAGPL has potential to cause impact on significant aquatic systems in the delta area.

Another major difference arises from Foothills' commitment to the Yellowknife/Pine Point lateral system. This area is discussed in answer to Questions 7 and 8.

Q Are there any differences between the protection measures proposed by Foothills and CAGPL relative to aquatic systems?

A In the general sense, both Applicants have conceptualized similar environmental concerns and protection measures in their respective submission documents. Some of the Foothills protection measures are more specific -- a fact that may be a result of the dates of submission of the respective environmental statements. Foothills has recognized potential conflicts between pipeline related activities and fish harvest, and has formulated protective measures aimed at avoiding conflicts with domestic commercial and sport fishing. Foothills also addresses protection measures to control and/or contain and remove debris entering water courses. These points seem to be lacking in the CAGPL submission.

Q A number of baseline surveys of the aquatic systems of the Mackenzie Valley have already been undertaken by various other agencies. Would you explain the rationale for your aquatic field program?

A The field program was intended to give us a basic familiarity with the area and a better understanding of aquatic systems along the proposed alignment. We also wanted to further identify sensitive areas, evaluate proposed crossing sites, and to recommend alternative crossings if appropriate. Inspection and evaluation of proposed wharf, stockpile and compressor station sites and proposed access roads was another reason for the field program.

Finally, the field program has facilitiated the identification of information gaps and has contributed to the ongoing development of monitoring programs and protection measures

As a result of this work, we have made several recommendations for changes in the pipeline routing. These are listed in Mr. Bouckhout's evidence. We have also enlarged the data base of aquatic information relative to such things as potential spawning locations and streams, stream nursery areas, possible overwintering areas, and fish distribution.

Q The Yellowknife/ Pine Point lateral system is proposed only by Foothills. What do you know of aquatic resources on this alignment, and what impact do you foresee from pipeline construction

along this route?

A The data base on aquatic systems along the Yellowknife/Pine Point lateral is much less than for the Mackenzie Valley main line route for the obvious reasons that environmental impact investigations have not been conducted in this area by Fisheries and Marine Service or by environmental consultants. We conducted preliminary lake and stream surveys along this route in early September, 1975, and will conduct both winter and spring investigations of these aquatic systems. We are also reviewing all fisheries information on the area, available from Fisheries and Marine Service and the Department of Economic Development, Government of the Northwest Territories. At present, our most complete information is on the domestic fisheries of the area. The mouths of the Horn, Kakisa, and Hay Rivers, and Kakisa, Tathlina and Buffalo Lakes support active domestic fisheries. We also understand that a number of streams and rivers in this area are utilized for spawning by fish from Great Slave Lake, and that a grayling sport fishery exists in the outlet of Great Slave Lake.

It is presently too early to make predictions of impact on the aquatic systems of this area, but our procedure here will be similar to that used on the mainline, that is, to study seasonal fish distribution; to identify spawning, nursery and overwintering areas; to evaluate the sensitivity of specific areas; and to make recommendations on re-

alignment, construction procedures and timing, contingency plans, and restoration.

I might add that since I wrote this more information on the -- especially the commercial fishery on Great Slave Lake and some of the biological aspects of aquatic systems along that alignment have come to light.

Q Do you feel that there are any information deficiencies relative to aquatic systems that will inhibit prediction of possible adverse impacts? If so, what are they and how do you intend to obviate those deficiencies?

A The major deficiencies relate to aspects of aquatic ecology during the winter. We do not know as much as we should about where various fish species are located in the winter or what is occurring in benthic communities during this period. Information is also scant on the ecology of fall-spawning fish relative to where they are spawning and overwintering. As I have stated before, our information base of the Yellowknife/ Pine Point lateral is presently inadequate.

We are attempting to overcome these deficiences with a late winter field program and additi onal field investigations along the Yellowknife/Pine Point lateral system during the spring and summer of 1976.

Q Dr. Finney, you are a avian biologist with the Lombard North Group Limited consultant to Foothills Pipelines?

WITNESS FINNEY: Yes, I am.

A And does the sheet attached to the prepared evidence and having your name at the top accurately describe your academic qualifications and experience?

A Yes.

Q Would you read the sheet, please.

A I got my B.A. at Queen's University, Kingston, Ontario, in 1970 and subsequently got my PhD. there in 1975, and that is this year.

In the spring of 1973 and 1974 I was retained by the Canadian Wildlife Service to compare the results of their census of lesser snow geese by aerial photographs to our ground estimates. The contract included establishing the confidence limits of the aerial survey technique.

During the summer of 1973 I was contracted by the Canadian Wildlife Service to census the birds of Melville Island, North-west Territories. This project was undertaken as a result of the recent natural gas discoveries in the area. The contract also included a banding program of brant and greater snow geese throughout the Western Arctic Islands.

My thesis research was entitled "Reproductive Strategies of the Lesser Snow Goose". The research for this degree was done during five summer seasons (1970 - 1974) at a nesting

colony of snow geese near CHurchill, Manitoba.

In September of this year I was hired by the Lombard North Group as an avian biologist.

Q What has been your involvement in Lombard's bird work relative to the Foothill's project?

A My own field work was restricted to the autumn migration segment of the 1975 program. I have, however, talked extensively with the people who did the summer field work and have a good impression of their intentions and accomplishments.

Q What was the purpose and nature of the past summer's avian program?

A The purpose of this program was to evaluate areas of potential conflicts between birds and construction and the operation of the pipeline. This information is used as a basis for relocation recommendations and to expand and refine other protection measures.

The Yellowknife/Pine Point lateral system was surveyed several times during June in order to:

(a) locate raptor nesting sites and

(b) obtain estimates of waterfowl breeding concentrations and species composition.

As baseline information was limited in this area, this study also supplied data which could be used to plan future field programs.

Breeding bird surveys were also made along most of the main line route. Several additional flights were made in the delta as this region represents a major waterfowl nesting area.

During July, specific locations, such as wharf sites, borrow sites, and compressor station sites were surveyed by a multidisciplinary team of biologists to identify areas of potential conflict.

During the autumn migration I visited those proposed wharf sites south of the Thunder River, which are not at existing wharf locations, to assess their relative importance to waterfowl and shorebirds during this period. The Yellowknife/Pine Point lateral was again visited during the fall to evaluate migration and staging area utilization.

Q Have these studies led to any recommendations for modification of Foothills original proposal?

A A recommendation to move the alignment to the east of Holme Creek partially reflects avian concerns. A pair of peregrines seen along the proposed alignment are of particular concern. This recommendation is still under consideration.

A potential conflict with nesting raptors has been identified where the alignment parallels the Norman Range north of Norman Wells and in the Bear Rock area. New recommendations

for realignment and relocation of facility sites have been recently forwarded to Foothills. Decisions based on these new recommendations area pending.

Q Do you recognize any major difference between the CAGPL and Foothills' proposals with respect to their potential impact on avian life?

A The most obvious difference is that CAGPL proposes to construct a line from Alaska and Foothills does not. Foothills does not, therefore, face potential problems to the west of the Mackenzie Delta.

Along the main line routing from Richards Island to the Alberta border, which is similar in both proposals, no major differences are apparent.

In contrast to CAGPL, Foothills proposes to construct a lateral system to serve the Great Slave Lake region. Potential problems along the Yellowknife/Pine Point lateral system with respect to birds exist primarily with migratory waterfowl in the Mills Lake/Beaver Lake area. Here, disturbance by additional barge traffic during construction is a possibility to be examined in more detail. Either pipeline has the potential to affect this area. CAGPL proposes to on-load barges at Hay River and travel through this area and Foothills proposes to use Hay River to a lesser extent and to construct a major stockpile and on-loading area at Axe Point, downstream from Mills Lake.

Q Dr. Whitney, you are a mammalogist and project manager with the Lombard North Group Ltd., a consultant to Foothills Pipe Lines Ltd.?

WITNESS WHITNEY: Yes, I am.

Q Does the sheet attached to the prepared evidence and having your name at the top accurately describe your academic qualifications and experience?

A Yes, it does.

Q Would you read the contents, please?

A I received a Bachelor of Biology from Earlham College, Richmond, Indiana, in 1965; a Master's in zoology from Indiana University in 1967. In 1967 and 1968 I was in an Systems Ecology program, Oak Ridge National Laboratory. 1968 through 1972 I was at the University of Alaska, Institute of Arctic Biology where I received a Ph.D. in zoophysiology. From there I went to Calgary, the University of Calgary where I was a post-doctoral fellow for two years.

My experience, in 1965 to 1966 I was a teaching assistant at Indiana University in general ecology.

From 1966 to 1967 I was a research assistant for Charles Krebs in population biology.

In the summer of 1968 I conducted research at Oak Ridge National Laboratory, Ecology Section.

From 1968 to 1970 I was a National Institute of Health predoctoral trainee at the Institute of Arctic Biology.

From 1970 to 1971 I conducted small mammal censuses for the International Biological program, Fairbanks and Prudhoe Bay, Alaska.

In 1971 I was a mamal consultant on Trans-Alaska Pipe for Dames & Moore Consultants.

From 1972 to 1974 I was a National Research Council postdoctoral fellow and lecturer at the University of Calgary.

In 1974 and 1975 I was an environmental consultant with Aquatic Environments Limited; I was a senior biologist directing research on an Alberta coal mine; was a consulting biologist for two gas pipeline projects and a tar sands project.

For the last eight months I have been the principal biologist, Western Region, for the Lombard North Group Ltd., and I am project manager for the Foothills Pipe Lines environmental study.

Q Would you briefly describe the past summer's field program with respect to mammal studies?

A Our effort was aimed toward assessment of proposed borrow, compressor station, wharf and stockpile areas. Our primary mammal-oriented concern at each area was to locate carnivore dens which would be destroyed by proposed development. We also attempted to assess ungulate range and to locate aquatic furbearer habitat in relation

to the development areas.

The general design of the field program had two advantages:

(1) the biologists gained familiarity with the line between the proposed facilities.

(2) the biologists could consult with geotechnical and route alignment personnel as potential site problems became apparent. Possible alternate sites could then be discussed and evaluated.

Q Would you give us an example of how you inter-acted with geotechnical personnel concerning mammal related problems?

A The proposed borrow area 452 at Milepost 92, two miles south of Sitidgi Lake, was surveyed on July 16, 1975. The site is a sandstone cliff approximately five miles east of the mainline route. Our field reconnaissance revealed two grizzly bear dens and an active network of caribou trails over and surrounding the cliffs. Clay colored caribou pellets were found, indicating that soil in the area may serve as a source of minerals for caribou. In conversation, Mr. Garry Dick of the Canadian Wildlife Service indicated that he shared this suspicion.

With this information we consulted with Foothills' geotechnical consultants and suggested that the cliffs might not be environmentally suitable for a borrow source. Kames in the same area were suggested by the geotechnical staff as possible alternate sources. Subsequent reconnaissance of these revealed bear feces, dens and a bear sighting. Our

final recommendation was that the cliffs and associated kames within the immediate area were sensitive and should be avoided.

Q Are you aware of any differences between the CAGPL and Foothills Pipe Lines Ltd. alignment which result in differing mammal concerns?

A Yes, I am. The alignment differences and the resulting variance in mammal related concerns are:

(1) The Foothills route does not include a line from the Alaska gas fields. Since Foothills will not cross the Northern Yukon and Northwest Territories, it is obvious that there will be no potential for direct impact on the Porcupine caribou herd and on Dall sheep populations.

(2) Foothills is committed to community servicing; for example, a small diameter line is proposed for Great Slave Lake community service. This lateral line will cross territory, not crossed by the proposed CAGPL line.

Q What are your major concerns along the Yellowknife-Pine Point lateral system?

A To date, an aerial survey of mammals and site investigations of facilities locations have been carried out along this lateral system, in June and September of this year respectively. Based on these studies our major concern is the potential impact on woodland caribou, wood bison and aquatic furbearers.

Q Do you plan to undertake studies on mammals along the lateral corridor?

A Yes, we do. As of November 10th, Lombard North mammalogists began a survey of the lateral system for caribou and wood bison. This late fall trip will be followed by two more surveys during the period of snow cover. We also plan additional spring surveys during the periods when caribou and bison will be calving.

Aquatic furbearers have not as yet been the subject of any formalized study, but we have collected data on the general distribution of beaver dams and muskrat pushups. At this time these data are not in a final form and probably will not be ready for objective interpretation until late December. Proposals for the upcoming 1976 field program include provision for a quantitative survey of aquatic furbearers.

Q Do you plan to continue the site-specific inspection strategy during your 1976 field program?

A Yes. We plan to survey facility locations this spring and again during the summer. Our field program will be aimed toward studying some of the sensitive areas in more detail and we also plan to continue our evaluation of the route alignment.

MR. HOLLINGWORTH: Mr. Commissioner, that completes the evidence of this panel and they are ready for cross-examination.

THE COMMISSIONER: Well, let's stop for tea before we have cross-examination.

(PROCEEDINGS ADJOURNED FOR A FEW MINUTES)

(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

THE COMMISSIONER: Let's begin, Mr. Bell.

CROSS-EXAMINATION BY MR. BELL:

Q Dr. Whitney, did you have an opportunity to hear or read it in the transcript about the exchange that I had the other day with Mr. Jakimchuk concerning potential inter-action between the Arctic Gas pipeline and moose which overwinter in the islands along the Mackenzie River?

WITNESS WHITNEY: I think I was in the audience during that time.

Q Do you feel able to comment on the concerns raised in that discussion? I'd specifically like you to refer to your assessment of potential inter-actions of both Foothills and Arctic Gas Pipelines, and what mitigative measures you would recommend, if any?

A Well, I think that that's an area that I'm definitely concerned about, and I think that the area for the reason for concern is that the pipeline may in some way prevent movement of moose, say from the hills down into the islands for over-wintering areas.

Q Yes.

A I think that after the pipeline is in the ground that that will not be a major concern, with my limited experience with moose, hunting moose, talking with moose biologists

this sort of thing would not impede moose movements. However, my main concern would be during construction periods when these moose might be moving and during that time I think that perhaps the major concern would be moose falling into the open pit and perhaps breaking a leg and not being able to move on. Mitigative measures I think would be if a moose was in the area of trying to erect some sort of form, whether it be a fence or something, to keep the moose from falling into an open pit. Now this sort of mitigative measure has not been recommended to Foothills Pipe Lines at this time

Q Well, would you have any concern that moose movements might be altered by the vehicular traffic and other construction activities along the line?

A No, I think that as I said before, that moose might avoid the specific area of construction but I don't think the traffic would prevent them from crossing a snow road, perhaps.

Q Would there be any difference in this regard between Foothills and Arctic Gas' plans?

A No, I would say that our mitigation measures, if you took them side by side now, concerning ungulates, that you might be able to find some differences but I don't think that this would reflect the concern that we have a different concern for these animal populations; and if a better protection measure was suggested I'm certain that I would make that to Foothills.

Q Well, there is a difference, though, isn't there? The moose come down from their summer range in November and December. Doesn't that make a difference between the two projects?

A It's a question of timing of construction in that area, I would refer that to Mr. Bouckhout who could perhaps answer that for you.

WITNESS BOUCKHOUT: Yes, Mr. Bell, that would be the obvious difference in that our construction season is really planned from early in the new year on, whereas I believe Arctic Gas plans on starting their construction sometime late in the fall. So as far as timing, the actual movement of moose, of course if you had vehicular traffic and other activity in the area in the fall when the moose are actually moving down the valley towards the Mackenzie River itself, there are some possibilities there for this activity to possibly somewhat impede moose movement, whereas if the activity of course occurs after the moose have already moved through that particular area, then you're not faced with that same type of problem.

MR. BELL: Thank you very much. Those are all the questions I have.

CROSS-EXAMINATION BY MR. BAYLY:

Q Mr. Bouckhout, if I can begin my questions with you, please. I'm referring to your statement of evidence at page 8, question 8, in which you state that you don't believe, in your answer, that either applicant can fully predict the entire spectrum

of significant inter-actions which will occur between the project and the environment. Have you at this stage formulated an opinion which you have passed on to Foothills Pipe Lines as to whether the environmental impact that you can predict at this stage are ones that your environmental consultants feel are acceptable?

A Well, I don't know what you mean by having passed on to Foothills Pipe Lines since I am part of Foothills Pipe Lines.

I very much believe in that statement. Foresight is always a great thing, but it is never 100%, whereas hindsight is always 20-20, of course.

As far as what we have considered thus far, I believe our consultants have done a very good job in being concerned about the number of areas in the biological realm, and I think they have done an excellent job of developing these concerns and now it's a matter of -- which is already of course under way -- reacting to the concerns in terms of elaborating them and reacting to them via various measures, various protective measures, everything from relocations to the other five that I've already designated.

Q With regard to the rest of the members of the panel, and perhaps you'd like to respond to this one by one, are you satisfied that Foothills as an applicant can produce a pipeline which will have impact on the environment which you consider to be acceptable with regard to the particular species or range of species in which you're interested?

WITNESS KONDLA: I feel that capability does exist.

WITNESS HAYDEN: I do think that Foothills can build an acceptable pipeline. I don't think that our job of identifying potential impacts and rating concerns, this sort of thing, is done by any matter of means is a continuing sort of thing. So far, their responses to our recommendations have been good and I would think that, you know, they require more from us, and if things go as they have in the past I think they probably can.

WITNESS FINNEY: I agree with Mr. Hayden. Obviously we don't have enough information yet on the Yellowknife/Pine Point lateral to be assured on -- but what I have been able to find from the literature and in their initial surveys, it doesn't indicate any problem that isn't overcome, if the recommendations that we forwarded to Foothills are accepted.

Q Dr. Whitney?

WITNESS WHITNEY: Now, if I understand this correctly, you would like to know if Foothills can build a pipeline in such a way that it is not going to have irreparable damage, is that essentially what you want to know?

Q What I wanted to know is whether you consider with regard to your field which is mammals, that Foothills can construct a

pipeline which will have impacts which are acceptable to the mammal populations that you are studying and will be studying. I don't mean that to suggest that they won't cause the death of one or more caribou or that it will be totally without impacts, because that is not your evidence, but will it be acceptable?

A Well, I think that you have to talk about who it is going to be acceptable to, and whether it is acceptable to me is much different than if it is acceptable to somebody else, perhaps.

Q Well, you are a consultant to Foothills, that's correct --

A Yes.

Q And part of you your input, as I understand it, is to give them advice about potential impacts and how to render those into plans that will cause the minimization or the minimizing of impacts or the mitigating of problems that are causing impacts. I am concerned with what is acceptable to you at this point.

A Yes, I would say that it could be acceptable, yes.

Q All right, and I don't mean that to suggest that it won't be without impacts and I believe that you have said in your evidence that there will be some impacts, is that correct? Or that you would anticipate that there would be some impacts?

A Oh, yes, I think so, yes.

Q Now, given that the

panel in general agrees that the pipeline can be built within the range of impacts which are acceptable to the consultants, I invite you to agree or disagree that your conclusions are based on a number of assumptions.

Now, some of you were here when I went over this list of assumptions with the panel for Arctic Gas, and I will go through these one by one.

The first assumption being that the engineers can plan for the construction of the pipeline in the fashion that they say they can, is that something that you have all accepted?

WITNESS FINNEY: Mr. Bayly, I assume you mean to say that the engineers can make the pipeline the way that they say they can, not to plan it the way that they say they can?

Q Yes, that the plans can be put into effect in the way that they say that they can be put into effect.

A If I could be permitted to address that first. I think that it is largely our terms of reference that we accept that the major format by which the pipeline will be built, will be adhered to, that is, for example, winter construction. I think, however, when you start getting down to details, if you are going to address the problem of environmental impact seriously, you have to look at the question of, to a certain degree, worst case, and you have to have in the back of your mind that

this particular constraint is put on building a pipeline, for example, and one assumes to a degree that that can be done, but one also has to take into consideration what happens if it isn't done.

Q I realize that and that is where you get into the area of mitigative measures that you contemplate being used if something does go wrong.

A There are other things that you do with that information as well, for example, I think that the primary , and this has been brought up many times before, the primary way of avoiding or of eliminating environmental impact is avoiding it and I think that one always adopts the point of view that one tries to avoid contact with animal populations as a first step, and one reason that you do that is that mitigative measures, such as, say, aircraft heights, you can reasonably assume that they are going to break down a certain proportion of the time.

Q All right, well, let's not get quite that far because that is another assumption that I will be getting to. If I can put this perhaps more clearly. One of your basic assumptions, I suggest to you, is that Foothills engineers can cause the construction of a buried, chilled 42" gas pipeline in the fashion that they have outlined in the application?

WITNESS BOUCKHOUT: I think , Mr. Bayly, that our consultants are working with the

plans that we've given them. Now, that's from which they draw their conclusions. That's not to say that there might not be some other way of building this pipeline which would be equally as acceptable, but they are working given the plans which we have designed to date.

Q Well, do I take it from your answer, Mr. Bouckhout, that you don't accept that they can do that? It may not be the best way of doing it, but do you or do you not accept that your engineers, as an assumption upon which you base your environmental work, that the engineers can do the physical part of the construction?

A Yes, I do accept that. I am just saying that there are other possibilities, obviously, which I know nothing about, but certainly there are other possibilities.

Q I appreciate that, and Mr. Hayden, have you any thoughts on this?

WITNESS HAYDEN:

A Just to agree that that is an initial assumption we make.

Q And did you have anything more that you wanted to say, Dr. Finney, before I go on to one of the others, because I wasn't sure that you understood that question.

WITNESS FINNEY: No, I think that I did understand the question. I think that I addressed it.

Q Dr. Whitney?

WITNESS WHITNEY: Yes.

Q Mr. Kondla?

WITNESS KONDLA: I believe the assumption you have outlined is implicit, although I can't recall it having been exactly stated during our work.

Q All right, if it had been stated there I think I wouldn't have needed to ask the question. Now, the next assumption that I'll ask you to agree with is that you have assumed that conflicts with areas of importance to the various animals, plants, fish and birds you are studying, will be avoided by the applicant if at all possible, and what I mean by that is taking into account not only physical possibilities but the economics of building the project at all. Mr. Kondla?

A Oh yes, it sounds reasonable.

Q Mr. Hayden?

WITNESS HAYDEN: I agree.

Q Mr. Bouckhout?

WITNESS BOUCKHOUT: I agree.

Q Dr. Finney?

WITNESS FINNEY: Yes, I agree.

Q Dr. Whitney?

WITNESS WHITNEY: Yes.

Q The n ext one is that if it is not possible to avoid certain areas that you

would like to see avoided because of your particular concerns, that mitigative measures can and will be devised to bring the impact into what you each consider to be within the realm of acceptance.

Mr. Kondla?

WITNESS KONDLA: I'll agree with that.

Q Mr. Hayden?

WITNESS HAYDEN: Yes, I will.

Q Mr. Bouckhout?

WITNESS BOUCKHOUT: Yes.

Q Dr. Finney?

WITNESS FINNEY: Yes, I agree.

Q Dr. Whitney?

WITNESS WHITNEY: Yes.

Q And I invite you to agree with the next assumption that the mitigative measures will work.

WITNESS KONDLA: Affirmative.

WITNESS HAYDEN: I just qualify that to say that they're the best mitigative measures that we can design, you know. I would prefer backups to mitigative measures in any case, which I think is planned.

Q Are you suggesting then, Mr. Hayden, that some of them may have been suggested but have not yet been tested?

A Well, I'm just leaving the possibility for error, more than anything. Probably a lot of mitigative measures haven't been tested, you

know, it's just possible there's errors.

Q Yes, but when you design a mitigative measure you design it on the assumption that it will work, is that correct?

A Yes.

Q Mr. Bouckhout?

WITNESS BOUCKHOUT: Yes, and to expand on that one point, as I stated in my testimony I personally anticipate that some of them probably won't work and we'll simply have to be ready to react to that circumstance if and when it does occur.

Q All right, and I assume that in those kinds of cases you will be looking for more than one possible mitigative measure, and you have outlined an scenario in the evidence that suggests that.

A Yes.

Q Dr. Finney?

WITNESS FINNEY: I think you have to assume your mitigative measures will work and in order to do that one tries to design the mitigative measures so as to be as conservative as possible. If you suspect disturbance at 1,000 feet, or 600 feet as in the caribou situation, going to 2,000 feet is a conservative measure, a conservative mitigative measure and you design that wherever possible.

Another fact is that if you suspect that mitigative measures weren't going to work, you might be prepared to stand up on your hind legs a little bit longer and say, "Avoid this spot, to look

at avoidance a little more carefully."

Q So in those cases where you are at this point or perhaps at a later point not satisfied with mitigative measures, you would anticipate arguing more strongly for avoidance of a certain area or a certain problem.

A Well, this comes back to your second point, to avoid it if at all possible. To avoid it if at all possible might mean a difference say of a couple of million dollars, and to the chairman of the Board that might not look possible, and depending on the seriousness of the conflict, I'm at the -- put in the position of having to talk a little bit louder or a little bit longer, but that situation has not yet arisen.

Q Now, do you share that, Dr. Whitney, that the assumption that the mitigative measures that you would anticipate employing will work?

WITNESS WHITNEY: Well, this is an assumption that I think is implicit in making mitigative measures, and I think they will work, and I also agree with Mr. Bouckhout. We also assume that some of them will not work.

Q And that is where you would anticipate having backup mitigative measures or alternates?

A Yes, we would try to think of these, but I think if there are going to be some things that we just might not be able to think of as far as being able to predict what's going to

happen as a result of a pipeline in an Arctic system.

Q All right. Did you take as one of your assumptions as well that the project could be built employing in those areas in the Northwest Territories where the applicant has adopted the plan to use winter construction methods, that that would in fact be possible?

WITNESS HAYDEN: Could I get you to re-state that? I didn't quite get it.

Q The applicant , Foothills, has said that it will use winter construction in areas within the Northwest Territories. Now I ask that you accept as an assumption upon which your work is based that in fact they are going to be able to do that. In a sense that's tied to the first assumption.

A Yes, it's true, although there are specific instances that have been discussed, the possibility of summer construction of major stream crossings or something like that.

Q Yes. In those specific areas where they outline winter construction procedure, you're basing your assessment of impacts on the fact that that can be done.

A Yes.

Q Mr. Bouckhout?

WITNESS BOUCKHOUT: Yes. Again, Mr. Bayly, I believe all the consultants have based their assessment on these various points. Again

I state that's not to say that it couldn't be done successfully given some other methods, but certainly this is the assumption that has been taken to date.

Q Yes. Dr. Finney?

WITNESS FINNEY: Yes.

Q Dr. Whitney?

WITNESS WHITNEY: Yes.

Q And a further assumption would be that the government regulatory agencies will be capable of meeting their expanded requirements and responsibilities and of properly regulating and policing, if you will, the construction of this facility.

WITNESS KONDLA: I give a very loud "yes" to that. / WITNESS HAYDEN: I think it's essential that that is the situation.

Q Yes, not only essential, I invite you to agree, but it is a basic assumption that you must make with regard to your anticipation of impacts.

A Yes, I think it's obvious too that most people don't think that the regulatory agencies are at that point right now.

Q Yes.

A By the time the pipeline is constructed I am assuming that they will be.

Q Yes. Mr. Bouckhout?

WITNESS BOUCKHOUT: I'd like a bit of elaboration on this particular point, Mr. Bayly. Are you saying that the governmen t has to be at a point

where they will hold us to what we say we will do? Is that the inference, or are you saying that the government agencies are going to have something beyond what we've already said we would do whereby the impact would be lessened or whatever?

Q Mr. Bouckhout, without second guessing what the terms of a certificate to proceed or whatever it may be called, will contain, I'm only asking you to accept as a basic assumption that whatever that contains, that the government agency or agencies involved in the regulating and enforcing of the rules that are set down in that, and rules for the pipeline built in the Mackenzie Valley corridor, will be ready and will be in a stage that they can be implemented a t the time of construction.

A I would say that the rules will be implemented, that's obviously a necessity. I-- perhaps it's not fair for me to gather the inference that we may not hold up to what we will say we will do but I think our assessment is based on what we say we will do.

Q I am not suggesting that, Mr. Bouckhout, I am just suggesting that one of the assumptions you make is that the government will be ready with its input. We have gone into this and I think you were present during the Arctic Gas panel when they accepted the assumption, for example, that if there were a game management problem, that game management could be conducted by the appropriate agency in the appropriate way?

A I would agree with you that full government input at a timely stage is necessary.

Q And is that a basic assumption that you make in predicting the impact or the lack of impacts of the project as you have foreseen it?

A Myself personnally, no .

Q Dr. Finney?

WITNESS FINNEY: I would have to agree with Mr. Bouckhout. I think we make the assumption that the pipeline will be built according to standards such that the impact on the environment is minimal and is within -- as best as possible -- within the realm of what we think they are going to be. I think that when we do that, though, we don't depend solely on government policing. I think that what we are interested in is a final solution or a final point that it will be done, and that, I think, has got two components: the company doing what it says it is

going to do and on top of that is policing, and to some extent they overlap, but to some extent they are separate, and it depends on the particular -- like, if you are interested in wildlife management, that is something that is probably more of a government problem than it is a pipeline problem. Other problems are more of a pipeline problem than a government problem and I think that we are assuming that it is going to be done. I don't think that we are making the assumption that it is going to all rest with the government, however.

Q All right, now, let me give you an example of this, Dr. Finney, that may relate to your own study of snow geese. Assume that snow geese can be disturbed by aircraft flights and I think that you would agree with that --

A Yes.

Q And assume that you make a recommendation to the company that aircraft flights over the pipeline corridor be at a minimum altitude of 2,000 feet and be of a frequency of .25 flights per hour or less. Now, that is the Arctic Gas consultants recommendation in your field. I suggest to you, that in order for that recommendation to be carried out, there must be not only company co-operation, but there must be a government regulatory agency able and willing to take on this responsibility.

A In that kind of an instance, seeing that there are other aircraft in the air that aren't associated with the company,

obviously the government has to be involved.

Q All right, and- would you accept that as far as that particular example is concerned, you must assume for the purposes of forecasting the effects of the aircraft flights, say, over the right-of-way, you must assume that that particular recommendation can be carried out, not only by the company, but by people who aren't necessari directly related to the company and not fireable by them for breaking that regulation?

A That is probably correct. The point that I was trying to make is that I would also be making the assumption that a government officer wouldn't have to be on every plane flight that was carried out by Foothills, because we would make the assumption that if Foothills said that they would keep their aircraft at 2,000 feet, that they wouldn't take off, and as soon as they got out of /sight come down to 100 feet in order to haze the geese.

Q I am not suggesting that they would, I am just saying that you may need the assistance of government regulation in areas that are outside the company's control, in co-operation with your project, as part of your ability to accurately forecast the impacts of this project?

A I think we've reached some kind of a consensus, Mr. Bayly.

WITNESS BOUCKHOUT: Excuse me, Mr. Bayly. Having framed your question that way, I agree.

Q Thank you, Mr. Bouckhout. Dr. Whitney?

WITNESS WHITNEY: I agree.

Q The next one that you assume, and it follows from the last one, that the applicant's environmental inspectors or whatever you will call them, and the government enforcement officers in their various capacities will be able to control the project and the people related to it in an environmentally acceptable way to each one of you? Mr. Kondla?

WITNESS KONDLA: Yes, that sounds all right.

Q Mr. Hayden?

WITNESS HAYDEN: Yes, I would make that assumption.

Q Mr. Bouckhout?

WITNESS BOUCKHOUT: Yes.

Q Dr. Finney?

WITNESS FINNEY: Yes.

Q Dr. Whitney?

WITNESS WHITNEY: Yes.

Q And the other one that you have referred to in your evidence this afternoon is that this applicant will not cross either Shallow Bay or either the North Slope of the Yukon or the interior of the Yukon with a lateral to pick up

gas from the State of Alaska?

WITNESS KONDLA: That is the assumption, yes.

WITNESS HAYDEN: Yes.

WITNESS BUCKHOUT: Agreed

WITNESS FINNEY: Agreed.

WITNESS WHITNEY: Yes.

Q Now, with regard to the studies themselves that you made and the gathering of the baseline data upon which you base your ability anyway to predict impacts both in kind and intensity, did you accept the following, and I will ask you again to answer in turn. Did you contemplate the completion of the Mackenzie Highway to any particular point?

WITNESS KONDLA: No, I didn't.

WITNESS HAYDEN: No, I didn't.

WINTESS BOUCKHOUT: I don't believe specifically. I believe in Foothills' plans they contemplated completion of the Mackenzie Highway to Wrigley, I am not exactly sure that is it,as far as the plans are concerned, but the completion of the Mackenzie Highway throughout was not contemplated, it was one option, but it is not a necessity.

Q Dr. Finney?

WITNESS FINNEY: I think that in our considerations we look at the situation as it is at the present time. That is the only way that you

can assess baseline information without becoming hypothetical.

Q And Dr. Whitney?

WITNESS WHITNEY: I think that we assumed the completion to the present state on the Mackenzie Highway and we are assuming that the Dempster Highway will be completed.

Q That it will be completed?

A Yes.

Q All right. Now, without relating this necessarily to your base line data, did you make the assumption in assessing potential impacts from the pipeline and related projects, the existence prior or during construction of either of these two highways, either in part or in full.

WITNESS KONDLA: In the sections of the Environmental Statement that I was responsible for I did not consider the highways.

Q Mr. Hayden?

WITNESS HAYDEN: Well, I think in those areas where the highway is presently existing, such as on the Dempster Highway via Inuvik, or on the Mackenzie Highway where the pipeline crosses it, this side of Simpson, those cases we more or less, we recognize the presence of the highway of course, so I guess we, to a limited degree, you know, I would say that I consider the effects of the two of them, sort of thing, but in the areas where the highway is not presently built, that is planned,

I didn't really consider the highway location other than perhaps at specific stream crossings where we would find out where the highway was proposed to cross and that would eliminate that, perhaps, or it would influence on where we would recommend that the pipeline be built.

Q Mr. Bouckhout?

WITNESS BOUCKHOUT: Well, the possible implications of a highway relative to Mackenzie Valley Transportation Corridor were discussed, albeit very briefly, in the Environmental Statement, but I think our assessment, at least the assessment of the consultants right now is really based on the pipeline and on existing features.

Q Dr. Finney?

WITNESS FINNEY: By and large I think that we did address ourselves to the pipeline and I think that that is probably justified. However, we did, in certain instances, I feel, address ourselves to the interaction of the highway and the pipeline, at least I have in my study of birds, particularly with respect to access.

Q And does that have anything to do with your predictions of the various impacts, the fact that there is in certain areas going to be a highway interacting with the pipeline?

A Yes, it does, except that I should qualify that and indicate that without doing any -- that it isn't extensive in any degree. If one was going to want to analyse it extensively, I

guess one could form an analogy between this and a statistical test where one was interested in the effects of X, the effects of Y and the effects of X and Y, the combined effects, the interaction term. Unless you have the good solid effects or a good solid handle on both X and Y, the prediction of XY is very difficult.

I think that, although on particular sites, to get back to it, and particular things, I have considered the extra access that the highway affords.

Q So that is the particular aspect of the highway that you have considered. You have isolated that from any others that you feel you can't base your predictions on?

A Yes.

Q That is access.

Dr. Whitney?

WITNESS WHITNEY: I think I would potentially agree with Dr. Finney. We've discussed some of these things. I agree with him.

Q Now, did you also consider within the terms of reference of your studies the possibility of an oil pipeline in a corridor occupied by the Foothills Gas Pipe Lines? Mr. Kondla?

WITNESS KONDLA: That issue was raised, but certainly as I answered the previous question, as far as the documents we've prepared to date, the assessment that appears there was uninfluenced by any possibility of an oil pipeline.

Q Mr. Hayden?

WITNESS HAYDEN: I agree essentially with what Mr. Kondla said. We have -- our considerations of a possible oil pipeline in the corridor had been at a very informal level amongst ourselves and we haven't really made a formal assessment of inter-related effects.

Q Mr. Bouckhout?

WITNESS BOUCKHOUT: Yes, again I agree with my previous comment that these -- the corridor concept in general was very briefly considered, given the time constraints, etc., that were placed upon us when we prepared this particular document, so we weren't able to go very extensively into consideration of things like oil pipelines and highways, although

I might add that the numbers of people who were involved in preparing this were also involved in impact studies on the Mackenzie Highway.

Q I understand that from your direct evidence. Dr. Finney?

WITNESS FINNEY: I don't think that we've considered the implications of an oil pipeline to any great extent.

Q Dr. Whitney?

WITNESS WHITNEY: Once again, I concur with Dr. Finney,

Q Now, given that the pipeline guidelines contemplate that the applicants will be giving -- addressing themselves to an assessment of the possibility of an oil pipeline as well as a gas pipeline, is that within the terms of reference that you will be requesting that the environmentalists take as a term of their work, Mr. Bouckhout?

WITNESS BOUCKHOUT: I have two points to make on that. That particular aspect, Mr. Bayly, No. 1, you called them rightly guidelines and they are in fact just that, they're not regulations, they are guidelines to guide any applicant toward preparation of environmental statements, and we certainly of course read these and within the sphere of our possibility and our resources and time, etc. when we prepared the environmental statements, we took it into account as much as we felt we could at that particular stage. I believe, as I recall, there is a

motion
possible before Commission now to consider the corridor concept as a separate topic or a separate phase, and we would certainly participate in that and by all means have our consultants consider some of these things and in terms of trying to grapple with the corridor concept, given a gas pipeline, given a highway, given the river barge system, given an oil pipeline, and so on, and given a communications system, all of these various components of the general transportation corridor concept.

Q This therefore isn't in the works as yet. You considered it as a guideline in approach and you have not used this but would contemplate doing so if it were something that were to be discussed at this Inquiry.

A Well, it's certainly going to be part and parcel of the long-range planning and environmental input of the various consultants. At this particular stage, our top priority is to produce the field reports which will arise from our summer's work, and make those available to the Commission.

Q Do the members of the panel then agree with the recent panel we have had give evidence for Arctic Gas that when comparing the potential impacts of a highway down the Mackenzie Valley and a chilled buried gas pipeline down the Mackenzie Valley, that the impacts of the highway environmentally are likely to be greater than those of a pipeline? Mr. Kondla?

WITNESS KONDLA: Yes, I agree

with that and I would further state that given an oil pipeline and a highway, then the whole impact position, speaking from a vegetation changes from moderate to little impact, to a possibly great impact.

Q Mr. Hayden?

WITNESS HAYDEN: I agree with the previous panel.

Q Mr. Bouckhout?

WITNESS BOUCKHOUT: I think, you know, if we were to do this adequately, there is a very great deal of co-ordination amongst the various proponents of parts of this particular transportation network which would be necessary to do an adequate job of considering the multiple impacts, if you will have it that way, of the transportation corridor given these various other facilities beyond a gas pipeline. You will appreciate, of course, that to do a complete job it would virtually mean re-doing to some extent everything that's been done for the gas pipeline for a highway, for an oil pipeline and so on. I would think that the people available here can, perhaps from their information base, from the general information base and from their own experience project through the possible implications of other aspects of a corridor. However, you know, to really do a bang-up job is going to take one hell of a lot of work.

Q All right, I'm not trying to lay any blame at the door of Foothills or at Arctic Gas' door, but all I'm asking for is the opinion of both Foothills and its consultants with regard to the

relative impacts of a highway and a buried chilled gas pipeline.

WITNESS FINNEY: Well, your question now has magnified itself to truly tremendous proportions.

Q They have a habit of doing that as I go down the line here.

A First of all, I agree with Mr. Bouckhout that any kind of proposed development, whether it be a highway or a gas pipeline, is going to have to be on the same order of magnitude, or an oil pipeline, is going to have to be on the same order of magnitude as the present study on a gas pipeline.

Secondly, I think that hidden in the depths of your question is the concern of the possible modifying effect of the gas pipeline, of increasing the probability of an oil pipeline and a highway, etc., and I don't think that we as biological consultants have the power to answer that question. It's not within our realm of expertise.

Q All right, well let's get back to the realm of your expertise and --

A That's what I was going to do.

Q -- that's where your particular value to the Inquiry is, let's just look at the two projects that are heading down the valley now. We've got the Mackenzie Highway completed to somewhere near south of Wrigley, and we have two proposals for

a pipeline and let me put it to you this way. The predictions that you are making with regard to the chilled gas pipeline, I suggest to you, are not predictions that could be applied either in specie or in magnitude necessarily to a highway down the Mackenzie.

MR. HOLLINGWORTH: Hasn't somebody answered that question?

A The information on base-line studies could be applied. How you would assess -- how you would make the inter-relationships between what the construction and use of the highway is going to d o on your baseline information would have to be re-assessed. Does that answer your question for you?

MR. BAYLY: I think so, but let me see if I understand it. You feel that the baseline data would be useful for the same study, for the two studies, but that the impacts of the two projects might be different and might have to be forecast as being different because of the different natures of the facilities and the different access, for example, that they provide.

A That's correct.

Q Dr. Whitney?

WITNESS WHITNEY: Well, I think that with proper protection measures in an perfect world that I can see no reason why a highway would necessarily be ten times worse than a gas line, and what particularly bothers me here is this idea of ten times, three times, many magnitude or manyfold,

people have been referring to this.

Q I don't think I've suggested that you have to put a number on it. I don't -- I want to stay away from n umbers, if possible, so if that worries you, put that out of your mind.

A Are you just talking about greater or less?

Q Yes.

THE COMMISSIONER: Could I interrupt for a minute? I'm concerned about the same thing as Dr. Whitney, that we've -- when Dr. Wilimovsky started this ball rolling back in June when he said -- gave us his views on the gas pipeline and then he said, "But if you're thinking of building an oil pipeline that's something like an order of three times in terms of impact, and a highway," he said, "is something like seven or ten," I've forgotten all of this, but I don't think he wanted to be wedded forever to that contribution that he cared to make to some extent off the cuff. But everybody has picked that ball up and has been running with it ever since, and you're the first expert we've had who kind of wondered a bit about adopting this thing. We don't -- all of the experts have said what they thought the impact of a gas pipeline would be. Then they've said "We don't really know what the impact of the Mackenzie Highway so far has been because we haven't seen the studies the government has carried out," and in any event they said, "No comprehensive examination of the impact of

the Mackenzie Highway or the Dempster is under way."

As far as an oil line is concerned, their view of the impact of an oil line appears to be purely conjectural. So I'm intrigued that someone like myself is inclined of the view that maybe these, you know, if you think this is bad, well then we'll get you an oil line and a highway, and -- well, at any rate, if you want to say anything about that, go ahead. I'm always listening but I'm listening a little more attentively when this kind of thing comes up.

A Well, my training has been in population biology and I think that we are concerned here about the impact of some construction project on populations. Well we are certainly concerned about it on individuals and communities' ecosystems and bioshperes, but in terms of populations, the way that you measure populations, would be density, birth-rate, death-rate, age structures and so on. I am somewhat confused by the idea that -- or I tell you, I find it very hard to see how, say, to be very abstract, an age structure in a population could be influenced ten times worse than, by highway than a gasline. If we want to look at some of the things that influence this, perhaps deathrate, the death rate of a highway. Well, people are certainly aware of -- or I am certainly aware of some of the slaughters that have occurred along the Steese and Taylor Highway in Alaska, caribou slaughters, and I certainly think that this has had an impact on the caribou individuals. Now, whether this has had an influence or an ultimate influence on the caribou age structure, I am not convinced of that.

As far as birth rate of a population; whether a highway is going to influence the birth rate of a population ten times or decrease it ten times, I am not sure of that. This is the type of thing that I am concerned about.

MR. BAYLY:

Q Dr. Whitney, can we look at it from the other end of the telescope and may I suggest to you that a highway and a pipeline may

be different in that they will -- that a highway, because it produces access to an unknown number of people with unknown motives with regard to the animals, may make your predictions more difficult to make than they would be with a pipeline that you knew about the activities on, the construction, and you knew about the frequency of operation and maintenance flights and the number of people that would be involved, and the likely things that could go wrong?

A Well, I just don't think that I agree with that. I think that if proper protection measures were made with the highway, and I am not too sure exactly what they are specifically, but I can give some general ones, that these impacts could be tremendously reduced. Now, if you would like an example, I could give you two.

Q Sure, yes.

A I think that in McKinley Park, for example, that there is a road running from the head of McKinley Park -- from one end of McKinley Park to the other end of McKinley Park, and there have been some studies done there and I have just read an overview of these studies, but it shows that in an area where you don't allow hunting and when you reduce traffic, or when you organize traffic patterns in a particular park, or in a particular area, that you can greatly influence animal population distribution in relation to the highway, and I think that in this particular experiment that was carried on in McKinley Park, that I just can't

see how a highway could have ten times the influence on any population parameter over a gas pipeline.

Q So you are saying that we just don't know enough about what use would be made of the highway and how it would be regulated, that is, the use of the highway would be regulated, and we must know those before you can predict impact?

A No, what I am saying -- I am not saying, talking about the problem of whether we can predict impact or not predict impact -- I am just saying that if we were going to have the world say if I had my druthers or if I was King, that we could devise something, it is just not that complex. I don't think. But there have been places where we have been able to show that if we conduct ourselves in a certain manner, that there is not going to be a tremendous increase of influence on a game population by a highway and I would follow this up by not perhaps quoting, but one of the things that I have learned from Dr. Geist is that the animals in many cases will behave in the way that we teach them to behave.

Q So if we are predictable, they will be predictable, is that what you are suggesting?

A No, I wouldn't go that far. I mean, with grizzly bears, something like that will -- it just doesn't follow.

Q YOu are saying that as a general statement then, that --

A I think that there is something to be learned from that, myself, and through this McKinley Park example, with a highway there, I think the impact is very, very low, compared to, say, what people have said that it might be in caribou slaughters in other places that we have been able to see.

Q Certainly. Assuming that you didn't go this far in your studies, is it fair to say that you didn't look at the Mackenzie Highway in the same way that the road in McKinley Park was studied? In your studies for Foothills Pipelines and the impacts and potential impacts of the gas pipeline?

A Well, I think that we have to have a base from which to work, and the base here is,if I assume that maybe the same assumptions that you are asking me to make about a gas pipeline, and if we want to work through those again we could, I don't know if it is going to be of any benefit at this time to do that, but I don't think that you are going to necessarily have a tenfold, threefold increase, and if you are going to ask me for my subjective opinion based on some studies, that my interpretation of these studies would be that it would be just a little above maybe a gas pipeline, but it would be so close that I think that you would have a very hard time measuring this.

Q All right, and when you put the two together, would you agree that you might expect additional impact from one -- from having

two rather than one, going down the same valley?

A I think that, yes, you would, if you went into that area, the more times you go into an area, I think the more you disturb it, the more impact you are going to have on it. I see that as a given.

Q And I can accept that you don't want to put numbers on it and you feel that under some circumstances impacts though potentially great on highways can be minimized by people taking care in making sensible regulations?

A Absolutely.

Q Yes. Now, we have through your testimony, that is, of all of you, references to things that you have recommended to Foothills as the applicant. Now, most of you were here when I went through this line of examination with Arctic Gas's witnesses. Would you tell me whether you have prepared for Foothills to date or at sometime since late in 1974 when you began your studies, a list of recommendations, not necessarily a static one, but a list of recommendations? Mr. Kondla?

WITNESS KONDLA: Perhaps not recommendations as such in one formal document, in terms of vegetation what I have provided is the material that appears in the impact statement and since that time I have made recommendations to Foothills about various field studies that they may want to undertake in the future, and of course, we

have also had informal discussions where I raised issues that I felt should be given further attention and made informal recommendations, but certainly no one formal collection of recommendations as such.

Q Mr. Hayden?

WITNESS HAYDEN: Do you mean recommendations relative to route and facility relocations?

Q That is a kind of recommendation to which we have reference in the direct evidence.

A Well, those sort of recommendations I think, I might want to verify this with Dr. Whitney, but I am sure that we made a list of specific route relocation recommendations and submitted those to Foothills. We made a number of other recommendations relative to the manner of their field program and not relocation type recommendations, many of these have been verbal, and some written, but it is, again, not a static thing, and it is not ended now. We will continue this, I think, in the future.

Q And you have probably seen the list that Dr. Gunn produced for the Inquiry of recommendations both general and specific. Is that the kind of list that you have prepared and continue to prepare throughout your work?

A If I recall right, Dr. Gunn's list is more a list of guidelines, how

they should conduct themselves, or conduct themselves in building a pipeline, is that right?

Q Well, that is part of it, Mr. Hayden, and the other part is that he gets as specific as to say a certain compressor station is located in an area very close to a raptor nest and in his opinion it ought to be moved as much as four or five miles if possible. So they go from the general to that --

A I think probably the written list of recommendations that I have made relative to aquatic systems has been more on the specific level. We anticipate a more generalized guideline or recommendation list with the presentation of our write up of this last year's field work. That will be a part of that.

Q Now, I will skip you, Mr. Bouckhout, and go to the other consultants. Dr. Finney?

WITNESS FINNEY: We made a few recommendations. They tend to be site specific. The general recommendations as to conduct, mitigative measures, etc., are presented in the Environmental Statement, these mostly appear in memoranda. However, we are in a different type of position than CAGPL's at in that we have only had one field season and are still trying to get back to analyse the data on this year's field season, as that information is analysed, then more recommendations will be forthcoming. I referred to a couple of recommendations that I have made to Foothills in my direct statement.

Q And how about you, Dr. Whitney?

WITNESS WHITNEY: This is a technical point that's been brought up so many times. But I'd like to say it again at least once, and that is that we have the benefit of the work that's been done by Canadian Arctic Gas and we've been able to draw from their protective measures or mitigative measures, and I think that we are more concerned, say, maybe of our lack of data would be along the lateral system to Yellowknife more so than on the mainline.

Q Now, you may have had the benefit of seeing all of Dr. Jakimchuk's recommendations, but I gather that we haven't yet, and what I'm suggesting is that -- and asking you is, whether you produced to this stage of your work and within those limits, recommendations which can be compared to recommendations that Dr. Gunn has produced and presented with his evidence to the Inquiry last week?

WITNESS BOUCKHOUT: I might put this whole issue of recommendations into context, if you like. With regard to Foothills and our biological consultants, as I indicated, our initial phase was to prepare the environmental statement and in preparation of that statement to attempt to identify areas of concern. Given those areas of concern, to identify protection measures which would be applicable to those concerns in order to mitigate possible impacts in those areas.

No. 2, I have indicated that

the initial primary thrust of our summer field program was evaluation of line locations, since that is one of the first things that has to be tied down in any major project like this. So the thrust of that was to identify recommendations relative to line location as soon as possible, and this is one of the reasons why we attempted to have a fair bit of contact in the field between geotechnical people, between biological people, and between Foothills personnel themselves. Beyond that, of course, the biological consultants did undertake fairly extensive field programs. From those field programs they have gathered a great deal of data and these data will be analyzed and put into report form, in fact this process is already on the road and hopefully the reports will be prepared very early in the New Year.

I have requested of the consultants that, as they prepare these reports, that they keep in mind recommendations not only relative to location but relative to various other concerns, including timing and procedural and so on, and I've requested of the consultants that they make recommendations on these various areas as they prepare the final reports and make this a part of the final report process.

Q I don't think you should feel badly because even with far more years work in it than you have put, Arctic Gas is still looking at line re-locations because of environmental concerns and expects to continue to do so for some time. What I'm concerned with, if we can go back to the recommendations

is whether these are things that we can persuade you, as we have appeared to have persuaded ARctic Gas, to produce as you go along to the Inquiry so that we will have the benefit of looking at those and either suggesting from various points of view of other participants that they are adequate or are not adequate, or that certain other things should be taken into consideration.

A Yes, I think of course to date you have at least everything that we have in finalized form. You have the environmental statement, in fact from my own testimony in table 1 you have a list of some 20 recommendations made by the biological consultants in regards to route locations and so on and when the report of the summer's activities is prepared, that will certainly be made available to the Commission.

Q Well, as I understand it, Mr. Bouckhout, the environmental statement is a statement made by the applicant, and even to date it is made as a result of recommendations from a number of concerns, both engineering and environmental, that have been expressed by the various people who either are on the staff or consulting Foothills. Now I assume that some recommendations that are made by various people are accepted; others are rejected, and others are modified because there is a concern or a conflict in concerns that has to be resolved among the various interests. Now, what I am requesting is not necessarily just the updates of the environmental statement, but the recommendations of the individual consultants as

they come along so that these can be assessed from the point of view of their particular disciplines, and this is something that we appear to have invited Arctic Gas to agree to do and they accepted that. Is that something that Foothills will accept to do?

A I agree that's certainly of benefit to the Inquiry and in fact again in table 1 you will note that there is a status legend of the various recommendations that have been made, and I have not simply put every recommendation down that we have accepted and made it look like we've accepted everything. There are some that have been accepted. There are some that are pending acceptance and in fact some of those which are pending acceptance may in fact never be accepted.

Q And those would -- would the consultants agree that the recommendations that appear in the environmental statement represent the sum total of the recommendations that they have made to date to Foothills? I'll start at your end this time, Dr. Whitney.

WITNESS WHITNEY: You mean to say that the recommendations that we've given them are the ones that they have?

Q Yes, that they have listed.

A No, I just mentioned one today, I thought that one of the recommendations around the working line perhaps should be snow-fenced . That's one, and I've learned of some others that I will

probably be making to them. I think this is a continual process, and if it wasn't continual process well then I think that it would be upsetting of recommending further protections.

Q All right. Dr. Finney, do all the recommendations that you have made to date appear in the list that Mr. Bouckhout has referred to, or are there others that have been made since or prior that don't appear there?

WITNESS FINNEY: I believe that the table refers to all recommendations up to November 1.

Q Yes.

A Well, since that time an additional recommendation has been made and that was mentioned in my direct concerning the peregrine falcons in the area of the Norman Range. Nothing has been omitted.

Q All right, Mr. Hayden?

WITNESS HAYDEN: I think I probably have some recommendations that are not necessarily pending but developing more than -- I'm still trying to identify the best possible recommendation to make, and there will be more coming, certainly.

Q All right, and Mr. Kondla?

WITNESS KONDLA: Barring recommendations about field programs, I think everything has been included.

Q That's what I'm referring

to, Mr. Bouckhout, that there will be some as we go along which we would like to have the benefit of as they are developed, and they don't all appear in the environmental statement because it is a static document and the work is ongoing.

WITNESS BOUDKHOUT: I agree this is a necessary process and with regards to recommendations made by our biological consultants there may be some cases where I reject certain recommendations and I obviously reject them on the basis of my view of both recommendations and potential repercussions and I would very much welcome other opinions on these various recommendations as well as recommendations beyond those made by our own consultants, as I would think the various government agencies would welcome such .

Q Now, a concern that I have is related to question 3 in your evidence found on page 1, and that is that your consultants were retained late in 1974 and the first two things that they did were to produce an environmental statement and an environmental map series, and what I'm wondering is how they were in a position to do that as their first step? It appeared to me that that would be a step that would come about as a result of gathering baseline data.

A Well, it was a step I omitted, of course, I really didn't strip it out into very minute steps. Obviously the first step is to gather all the available data, that is the data that is available to the consultant at that time, put all that together, analyze it, read it, put it together in some

semblance of an environmental statement and an environmental map series, and that's the process which in fact was done. Now the various people, as I've stated, who worked on this project were familiar with the northern areas we were dealing with, perhaps not totally familiar with the entire line length but certainly with portions of it and other similar areas. They were familiar with a great deal of the literature involved. They were disciplinary specialists, in other words a botanist was not called upon to write a mammal section or vice versa. So the process really was for the people to get together to assemble the team, the team to assemble the information, to analyze the information and from that to ultimately produce the environmental statement and the environmental map series.

Q Well, if things in the environmental statement turn out to be different from what you initially thought, are you concerned that the applicant may not want to re-write the whole thing or re-write portions of it that are not borne out by the baseline data and predictions that are made by your consultants?

A I am very sorry, Mr. Bayly, you really lost me on that one. Am I concerned that the applicant, meaning Foothills, meaning me, would not be willing to re-write the statement? No, I am not concerned about that at all. I think that definitely will be done. Whether we re-write the statement as a statement or whether we re-write the types of things

of content that is in the statement into an environmental manual, which has already been brought to light, the concept of an environmental manual, that certainly will be done. I have made it quite evident that what is in the statement is a base from which we start and that base is subject to alteration.

Q Now, this statement, as I take it, really covers the main line.

A That is correct.

Q It doesn't cover the laterals to the various communities and in particular the two long laterals to Yellowknife and to Pine Point?

A No it does not.

Q And the information with regard to those laterals as I understand from the evidence today has been collected mainly during the last six to eight months, although some of that started a bit before that?

A Yes, a great deal of the information as far as our own particular field studies has been collected over the last season, over the last field season; however, when we prepared the originaly Environmental Statement, again given time limitations and data availability, a fair bit of data which apparently was available on that particular area did not surface and so we did not spend a great deal of time trying to find it. That data has since surfaced, as Mr. Hayden, for instance has indicated, he has found a great deal of information he waasn't previously aware of, and that type of information will now be incorporated into future reports, or particularly the upcoming report.

Q And I gather that Foothills will want to verify some of the things that

are gathered from the literature that you didn't have before in further field studies to make sure that you are satisfied that the conclusions reached in that data, -- or sorry, in those reports, are ones that you can rely on?

A We will certainly want to continue and do some more studies. I certainly wouldn't want to suggest that we are going to duplicate everything that has been done since that will be a waste of effort to a great extent, but we will certainly carry on and do some extension of what is available and fill in some gaps wherever there are gaps.

Q Now, you are talking about an upcoming report which will give us some information on the laterals, and will that bring the information on the laterals and the recommendations made by the consultants to the same level that you are at with regard to the mainline?

A I think that will pretty much depend on the individual subject area. I would turn that question to the various specialists on the panel to comment in their particular areas.

Q Perhaps you could comment on that starting with Dr. Whitney.

WITNESS WHITNEY: I am thinking -- it doesn't mean that I don't want to answer the question.

Q We could start at the other end, if you would prefer.

A The thing that I am thinking about is mainly healthy biological variability, and many biological systems seem to work on a circ-annual basis, on a yearly rotational basis, and one thing that is very important for us to know is the variability from year to year on certain types of biological phenomena, as has been showed out by some fo the work for Renewable Resources. I think that the only way that some of that information can be made comparable to some of the information that already exists, say, maybe four years, would only be by collecting four years of data; so I think that in some cases for it to be comparable, we are going to have to look at variability, say, over a four year period. However, I haven't gone into it in detail, but there seems to be a wealth of information, say, on the Yellowknife lateral from the Canadian Wildlife Service flights, that has at this time not been pulled together, say, for woodland caribou, that may give us the ability to assess this variability of circ-annual phenomena and it might take it beyond the data base that already exists because this particular area in relation to Wood Buffalo Park has been studied, say, in fair detail by Dr. Fuller, in some of his reports back to 19 -- oh, maybe the late '40's.

Q So you would have to say in answer to the question that I asked, that depending on the species and the amount of data available, you may face years of research in some

areas, but you may find in other areas or with regard to other species that the information is already there and all you have to do is to verify that it is true by observation?

A Yes, thank you for summarizing that for me, I will get that down. But it is essentially what Mr. Bouckhout said, but I felt that it could use some follow up.

Q Right. Dr. Finney?

WITNESS FINNEY: I think that the same situation basically applies to birds as well. If we can, in particular, species of particularly waterfowl, there has been a large amount of work done on breeding censuses during the summer and if I can -- I am going to take a look at those reports, I hope, and if the data is good enough over the number of years, then obviously we have a good base to start from. The only point that I think we should add is that the Yellowknife lateral is not -- will not be commenced until two years after construction of the rest of the line, is that correct ?

WITNESS BOUCKHOUT: I think it would be difficult to say, but I would say, you know, obviously the prime consideration for construction is to get the main line in before you worry about service laterals, so the construction of the Yellowknife service lateral is certainly beyond the construction of the main line, so we do have a fair bit of time play involved between --

Q They are part of the same application, though, Mr. Bouckhout, you would agree with that?

A Oh, certainly. They are definitely part and parcel of the application.

WITNESS FINNEY: But the point that I was going to make, though, Mr. Bayly, was the fact that I think that we have, oh, three or four years anyway in which we can get some kind of assessment of the healthy biological variability as Dr. Whitney mentioned, for those species where we feel that it's lacking at present.

Q Is that your opinion as well, Mr. Hayden?

WITNESS HAYDEN: Well, I think with regard to aqautic systems that the report that we will be presenting to Foothills early in the year will not bring the information base or knowledge of the area to the same level in a number of instances, and I refer specifically to, well, sort of site specific potential crossing sites, this sort of thing. We will have, I think, some pretty good information on some of the general biological aspects of the various fish species, but we won't have, by that time had an opportunity to examine in detail potential crossing sites. So, with that rider, we won't be at the same level as the main line, but we will be working toward that in the coming season.

Q Mr. Kondla?

WITNESS KONDLA: Let me first

restate your question to make sure that I have it right. The question is, will the report that is being discussed here, which will hopefully appear sometime in the new year, will it contain sufficient vegetation information to bring out information up to par with the information that is currently available for the mainline.

Q Right.

A The answer is no.

Q And would it take a number of years to develop that?

A I think that it will probably take at least two years, yes.

THE COMMISSIONER: Mr. Bayly, I think that that is probably enough for today. You are not close to finishing, I don't suppose?

MR. BAYLY: No, sir -- never.

THE COMMISSIONER: Well, we will adjourn to 9:30 tomorrow morning then.

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